PRICE $ 2.50

SERVICE MANUAL

PACE CB SIDETALK 1000M/1000B
CITIZENS BAND TRANSCEIVER

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SECTION I
GENERAL INFORMATION

1.1 GENERAL DESCRIPTION

This manual contains installation, service, and maintenance information for the PACE Models SIDETALK 1000M (Mobile) and 1000B (Base Station) Transceivers manufactured by PATHCOM INC. It also includes a circuit description and all necessary information required to perform a troubleshooting analysis and a complete alignment of the PACE Models SIDETALK 1000M and 1000B.

The PACE SIDETALK is designed to operate on either AM (Amplitude Modulation), Upper Single Sideband (USB), or Lower Single Sideband (LSB). Twenty-three channel CB operation is made possible with 10 crystals in a highly stable synthesizing circuit and a separate crystal controlled 7.8025 MHz carrier oscillator.

Both transceivers are identical except for the following differences:

A. The 1000M is only operable from a 12 volt nominal DC, negative or positive ground source. The 1000B may be operated from either a 117 volt AC source or a 12 volt nominal DC, negative or positive ground source. Internal protection is provided in both transceivers to prevent damage in the event that reverse polarity DC is applied.

B. The 1000B, only, contains a clock with a timer switch which works in conjunction with the power switch to automatically turn the transceiver on at a desired time.

C. The meter used in the 1000B measures incoming signal strength in "S" units, and outgoing power in a relative reading and center scale. It is also capable of making Standing Wave Ratio (SWR) measurements by calibrating the meter with front panel controls. The meter used in the 1000M does not have direct reading SWR capabilities.

1.2 SPECIFICATIONS

Technical specifications for the PACE SIDETALK 1000M and 1000B Transceivers are shown in Table 1–1.

TABLE 1–1
TECHNICAL SPECIFICATIONS

GENERAL

Channels		23 (AM, USB & LSB)
Operating Voltage	(1000B)	117 V AC or 12 V Nominal DC ± Ground
	(1000M)	12 V Nominal DC ± Ground
Frequency Range		26.965 to 27.255 MHz
Microphone		Low Impedance, Dynamic
Speaker		3" – 8 Ω
Antenna Impedance		50 Ω
Size	(1000B)	11" x 5¼" x 14"
	(1000M)	7½" x 2¼" x 10"
Weight	(1000B)	16 Pounds (With Accessories)
	(1000M)	10 Pounds (With Accessories)

RECEIVER

Sensitivity	1 μV for 10 dB $\frac{s+n}{n}$ (AM)
	0.5 μV for 10 dB $\frac{s+n}{n}$ (SSB)
Selectivity	± 2.1 kHz @ –6 dB
	± 10 kHz @ –40 dB
Clarifier	± 500 Hz
Squelch Range	1–500 μV
Audio Output	3 W

TRANSMITTER

Compliance	(1000B)	Type Number 42121, Part 95D
	(1000M)	Type Number 42417, Part 95D
Power Output		4 W (AM)
		12 W P.E.P. (SSB)
Harmonic Suppression		50 dB Minimum
Carrier Suppression		40 dB Minimum (SSB)
Unwanted Sideband Suppression		40 dB Minimum (SSB)
AM Modulation		High Level Class B
SSB Generation		Balanced Modulator/Crystal Lattice Filter

1.3 CRYSTAL INFORMATION

Frequency synthesized circuitry is used to obtain all 23 of the Class D Citizens Band channels for all modes in both receive and transmit. The frequency of each crystal is shown in Table 1–2. Other synthesizer information is described in Section II.

Whenever a crystal is replaced, the trimmer associated with that crystal must be readjusted, and all synthesizer frequencies checked. Refer to Section IV for correct alignment procedures.

TABLE 1–2
CRYSTAL FREQUENCY CHART

Crystal	Frequency in MHz
Y201	11.740
Y202	11.790
Y203	11.840
Y204	11.890
Y205	11.940
Y206	11.990
Y207	7.4225
Y208	7.4325
Y209	7.4425
Y210	7.4625
Y410	7.8025

All crystals supplied for use in PACE Models SIDETALK 1000M and SIDETALK 1000B have been individually checked for activity, proper frequency, and freedom from spurious and parasitic oscillations. Use of any crystal not supplied by PACE cannot be insured against off-frequency operation, spurious radiation, substandard performance, or temperature drift; nor will defects, which in our opinion, were caused by use of such crystals be corrected under the warranty.

CAUTION

The Federal Communications Commission expressly prohibits the substitution or addition of any transmitter oscillator crystal unless the crystal manufacturer or PACE has determined that the crystal will provide the transmitter with the capability of operating within the specified frequency tolerance of 0.005%.

NOTES

SECTION II
PRINCIPLES OF OPERATION

2.1 GENERAL

This section provides a general description of the SIDETALK 1000M and 1000B operating principles. Overall system operation and major circuit functions are described.

Different combinations of synthesizer frequencies are used to obtain the proper frequencies for AM and SSB operation in both transmit and receive. To simplify the circuit description, a separate block diagram is used for all transmit functions. Receiver circuitry is straightforward and a single block diagram is used for all functions. Whenever necessary, a simplified partial schematic is presented for individual circuit descriptions. Refer to the main schematic in Section V for references to individual components.

NOTE

A list of schematic symbols and their definitions are given in Table 2–1.

TABLE 2–1
SCHEMATIC SYMBOLS

Symbol	Definition
RB	+9 V Receiver Supply (AM and Sideband)
SRB	+9 V Receiver Supply (Sideband Only)
ARB	+9 V Receiver Supply (AM Only)
TB	+13.8 V Transmitter Supply (AM and Sideband)
STB	+9 V Transmitter Supply (Sideband Only)
ATB	+9 V Transmitter Supply (AM Only)
TB.CB	+9 V Transmitter Supply (CB)
BB	+9 V Transmitter and Receiver Supply

2.2 OSCILLATORS

2.2.1 Synthesizer

The synthesizer consists of the following sections: (Refer to Figure 2–1.)

A. 7.4 MHz Oscillator (Q10)
B. 11.8 MHz Oscillator (Q11)
C. 19 MHz Mixer (Q9)
D. 19 MHz Amplifier (Q8)
E. 34 MHz Mixer (Q7)
F. 34 MHz Amplifier (Q6)

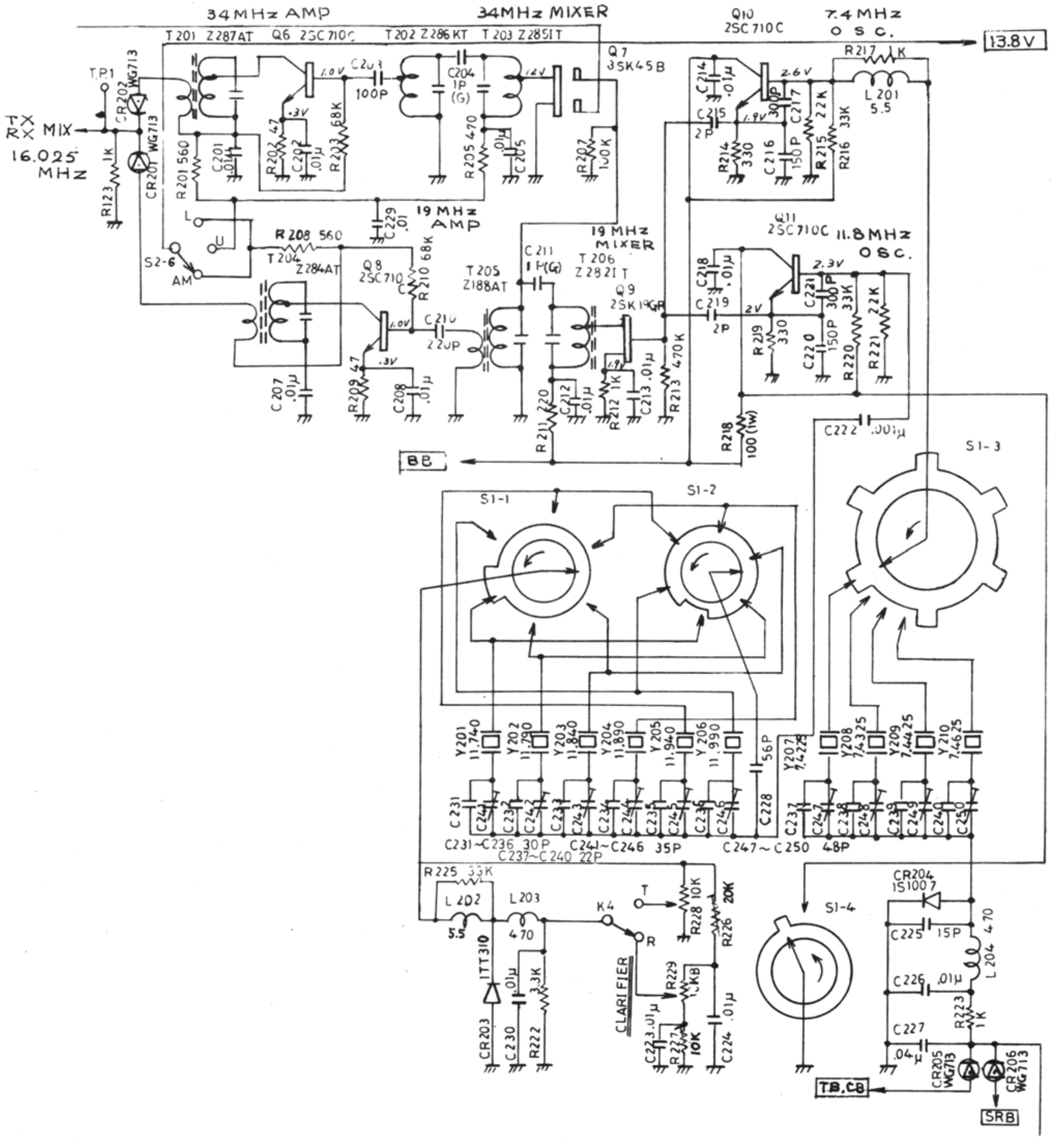

Figure 2-1. Synthesizer

Also included as part of the synthesizer is the doubled frequency (15.605 MHz) of the 7.8025 MHz carrier oscillator (see Figure 2–2).

All oscillators are crystal controlled as shown. The actual frequency is determined by the crystal selected, with one exception. Note that CR204 (in the 7.4 MHz oscillator) is forward biased in all transmit modes and receive sideband modes. In the AM receive mode CR 204 is reverse biased and the oscillator frequencies are increased by 2.5 kHz due to the network consisting of L204, R223, and capacitors C225 thru C227.

Synthesizer frequencies used in the various modes are given in Table 2–2.

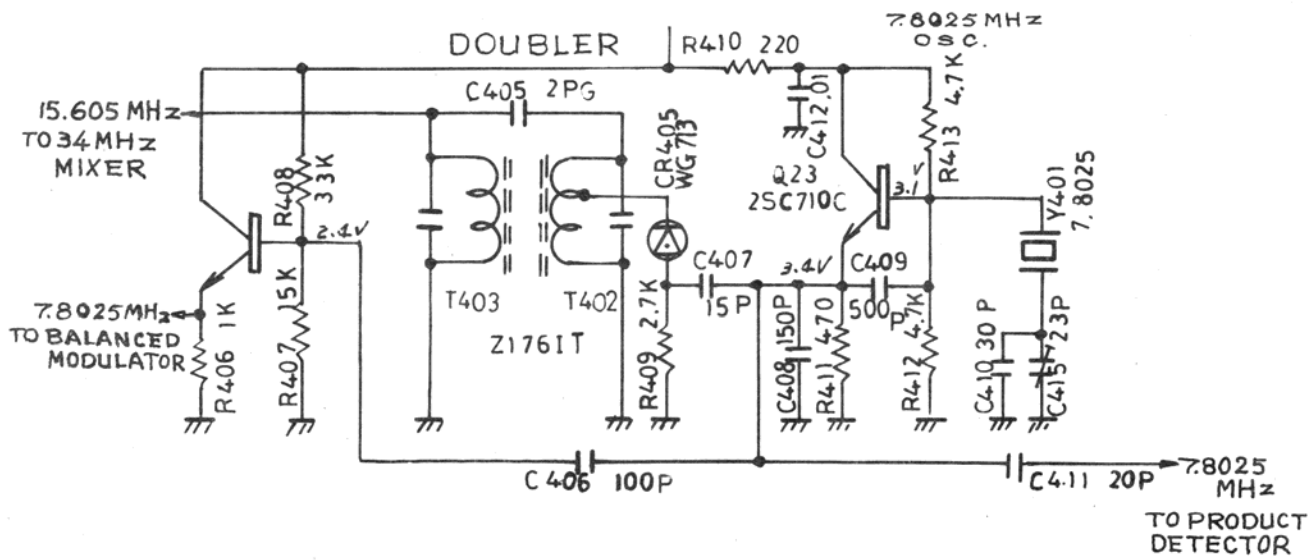

Figure 2-2. 7.8025 MHz Oscillator and Doubler

TABLE 2–2
SYNTHESIZER FREQUENCIES

Chan.	Frequencies in MHz Q10 Osc.	Q11 Osc.	A 19 MHz Synth.	B 34 MHz Synth.	Frequencies in MHz Q10 Osc.	Q11 Osc.	C 19 MHz Synth.
1	7.4225	11.740	19.1625	34.7675	7.425	11.740	19.165
2	7.4325	11.740	19.1725	34.7775	7.435	11.740	19.175
3	7.4425	11.740	19.1825	34.7875	7.445	11.740	19.185
4	7.4625	11.740	19.2025	34.8075	7.465	11.740	19.205
5	7.4225	11.790	19.2125	34.8175	7.425	11.790	19.215
6	7.4325	11.790	19.2225	34.8275	7.435	11.790	19.225
7	7.4425	11.790	19.2325	34.8375	7.445	11.790	19.235
8	7.4625	11.790	19.2525	34.8575	7.465	11.790	19.255
9	7.4225	11.840	19.2625	34.8675	7.425	11.840	19.265
10	7.4325	11.840	19.2725	34.8775	7.435	11.840	19.275
11	7.4425	11.840	19.2825	34.8875	7.445	11.840	19.285
12	7.4625	11.840	19.3025	34.9075	7.465	11.840	19.305
13	7.4225	11.890	19.3125	34.9175	7.425	11.890	19.315
14	7.4325	11.890	19.3225	34.9275	7.435	11.890	19.325
15	7.4425	11.890	19.3325	34.9375	7.445	11.890	19.335
16	7.4625	11.890	19.3525	34.9575	7.465	11.890	19.355
17	7.4225	11.940	19.3625	34.9675	7.425	11.940	19.365
18	7.4325	11.940	19.3725	34.9775	7.435	11.940	19.375
19	7.4425	11.940	19.3825	34.9875	7.445	11.940	19.385
20	7.4625	11.940	19.4025	35.0075	7.465	11.940	19.405
21	7.4225	11.990	19.4125	35.0175	7.425	11.990	19.415
22	7.4325	11.990	19.4225	35.0275	7.435	11.990	19.425
23	7.4625	11.990	19.4525	35.0575	7.465	11.990	19.455

A – Used in LSB TX, LSB RX, and AM TX.
B – Used in USB TX and USB RX $= \{LSB\ RX + (2)\ 7.8025\}$.
C – Used in AM RX $= \{2.5\ kHz + AM\ TX\}$.

2.2.2 Carrier Oscillator

Transistor Q23 is a crystal controlled oscillator operating at a frequency of 7.8025 MHz. Output from the emitter of Q23 is coupled to the product detector via C411, and to the balanced modulator via C406 and Q24. Another output is coupled to frequency doubler transformer T403. The doubled frequency, 15.605 MHz, is then fed to the 34 MHz mixer in the synthesizer.

2.3 AM TRANSMITTER (Refer to Figure 2-3)

Signals from the 19 MHz synthesizer (Column A of Table 2-2) are fed to one gate of the dual-gate FET transmitter mixer Q5. The other gate receives a 7.8 MHz signal from Q24.

During AM operation the balanced modulator is unbalanced since CR602 is reverse biased and no audio is coupled to the modulator. Carrier leakage is passed through the unbalanced modulator and coupled to Q5 via FL301 and Q17.

The 27 MHz output from Q5 is then amplified by Q4, bandpass amplifier, and Q3, pre-driver. It is then fed to driver Q2 and final power amplifier Q1 where it is modulated and coupled to the antenna.

2.3.1 Modulator

Audio signals from the microphone are coupled to Q25 which functions as an automatic gain control during AM transmission. The audio is then amplified by Q26 and Q30, which functions as an active low-pass filter, and further amplified in IC501. The audio from IC501 directly modulates Q2 and Q1.

2.3.2 Modulation Limiter

AF modulation frequencies from IC501 are fed through C611 and R616 to CR603 which rectifies the audio component. The rectified DC is then filtered and fed to the gate of Q25. This bias is adjusted by R616 to suppress the stage gain so that modulation does not exceed 100%.

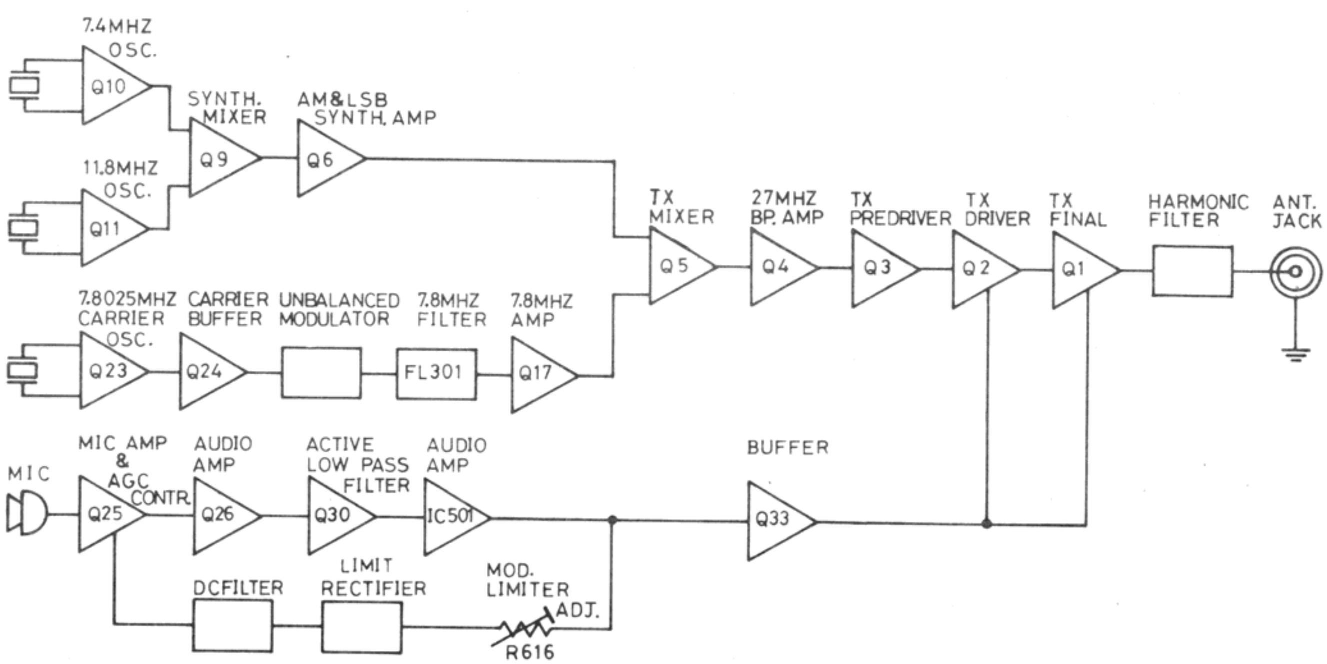

Figure 2-3 AM Transmitter Block Diagram

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2.4 SSB TRANSMITTER

2.4.1 Lower Sideband (LSB) Transmitter (Refer to Figure 2-4)

During Single Sideband (SSB) operation, audio signals from the microphone are amplified in Q25 and Q26 and coupled to the balanced modulator via C612. This audio signal modulates the 7.8025 MHz carrier frequency to produce a suppressed carrier Double Sideband (DSB) signal. One of the two sidebands is cut off by crystal filter FL301, and the other sideband appears as a suppressed carrier SSB signal.

The SSB signal is amplified in Q17 and coupled to one gate of transmitter mixer Q5 via C322, CR106, and C128. The other gate of Q5 receives the 19 MHz synthesized signal from Q9 and Q8. Synthesized frequencies are listed in Column A of Table 2-2. An LSB modulated 27 MHz signal appears at the output of Q5 where it is amplified by Q4 bandpass amplifier, and Q3, pre-driver. It is then fed to the antenna via driver Q2 and final power amplifier Q1.

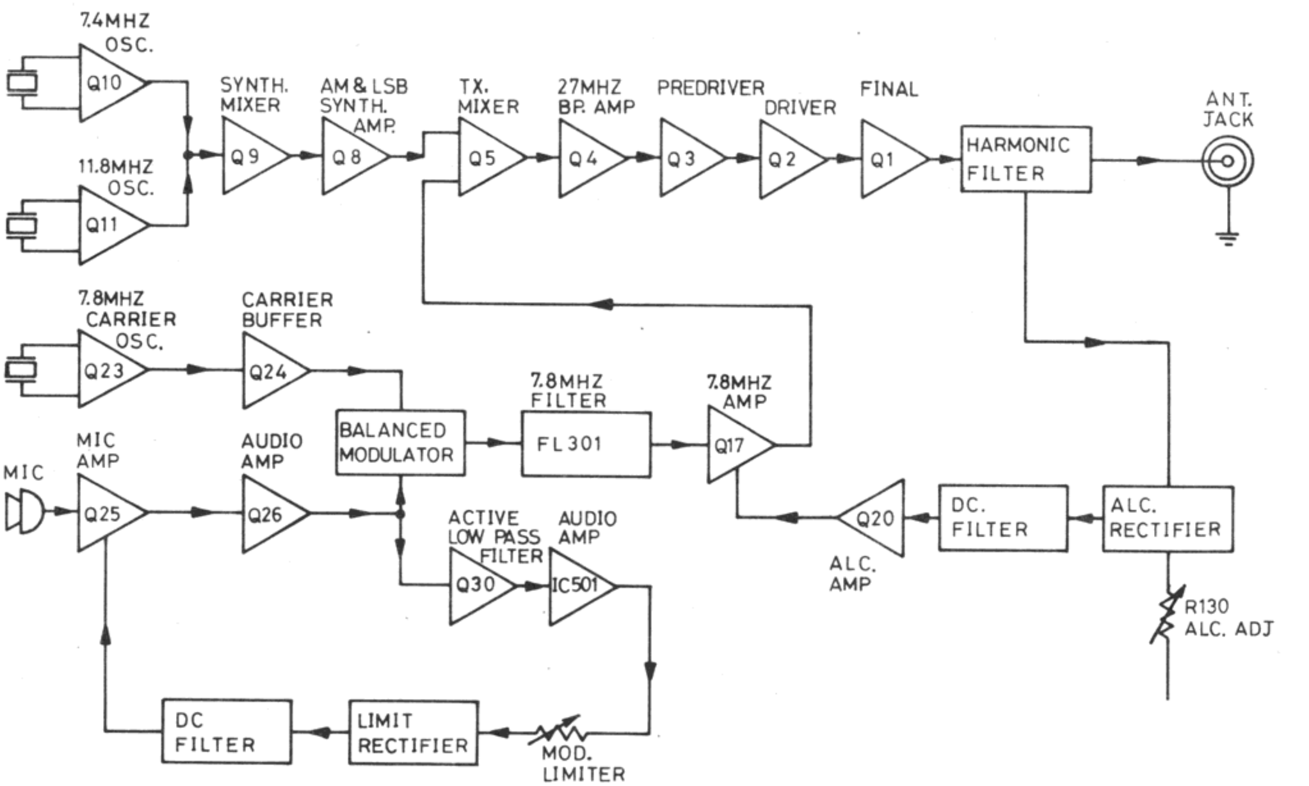

Figure 2-4 Lower Sideband Transmitter Block Diagram

2.4.2 Automatic Level Control (ALC)

SSB transmit output is coupled through C107 to ALC rectifier CR108 and CR109. The rectified signal is then filtered and amplified in Q20. This amplified DC controls the bias on Q17.

2.4.3 Upper Sideband (USB) Transmitter (Refer to Figure 2-5)

To obtain USB transmit frequencies, 19 MHz synthesized frequencies are mixed with the doubled frequency from the carrier oscillator in Q7. This produces the 34 MHz synthesized frequencies listed in Column B of Table 2-2.

The 34 MHz frequencies are then mixed in Q5 with the suppressed carrier SSB signal from Q17. The difference frequency produces the upper sideband which is then amplified and fed to the antenna. All other circuitry is the same as that described in Sections 2.4.2 and 2.4.3.

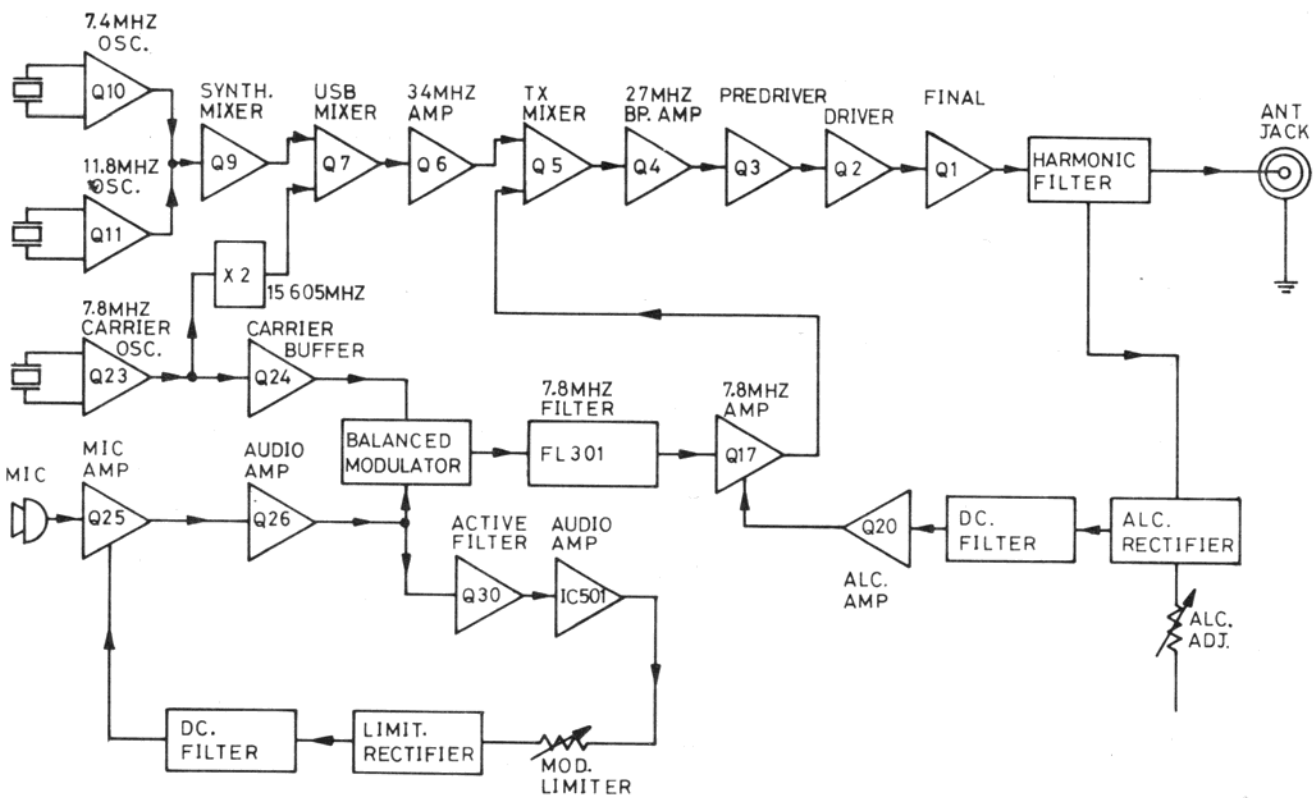

Figure 2-5 Upper Sideband Transmitter Block Diagram

2.5 RECEIVER (Refer to Figure 2-6)

2.5.1 RF Amplifier and Mixer (AM, USB, and LSB)

The RF signal from the antenna passes through the antenna switching circuit and is coupled to RF amplifier Q12 via T301. After amplification, the signal is fed to Gate #1 of RF mixer Q13, where it is mixed with the local oscillator frequency from the synthesizer.

2.5.2 Local Oscillator Frequency

Oscillator circuitry was discussed in Section 2.2. Synthesizer frequencies, for each channel, are shown in Table 2-2; Column A for LSB, Column B for USB, and Column C for AM.

2.5.3 IF Amplifier (AM, USB, and LSB)

IF signals from the mixer are fed into the crystal filter which passes only the desire signal and cuts out the undesired signals. In AM mode, the carrier (plus one sideband) passed through the 7.8 MHz crystal filter bandpass.

After the filter, the signal is amplified by Q17, Q18, and Q19, and then fed to the detector or SSB product detector as selected by the function switch.

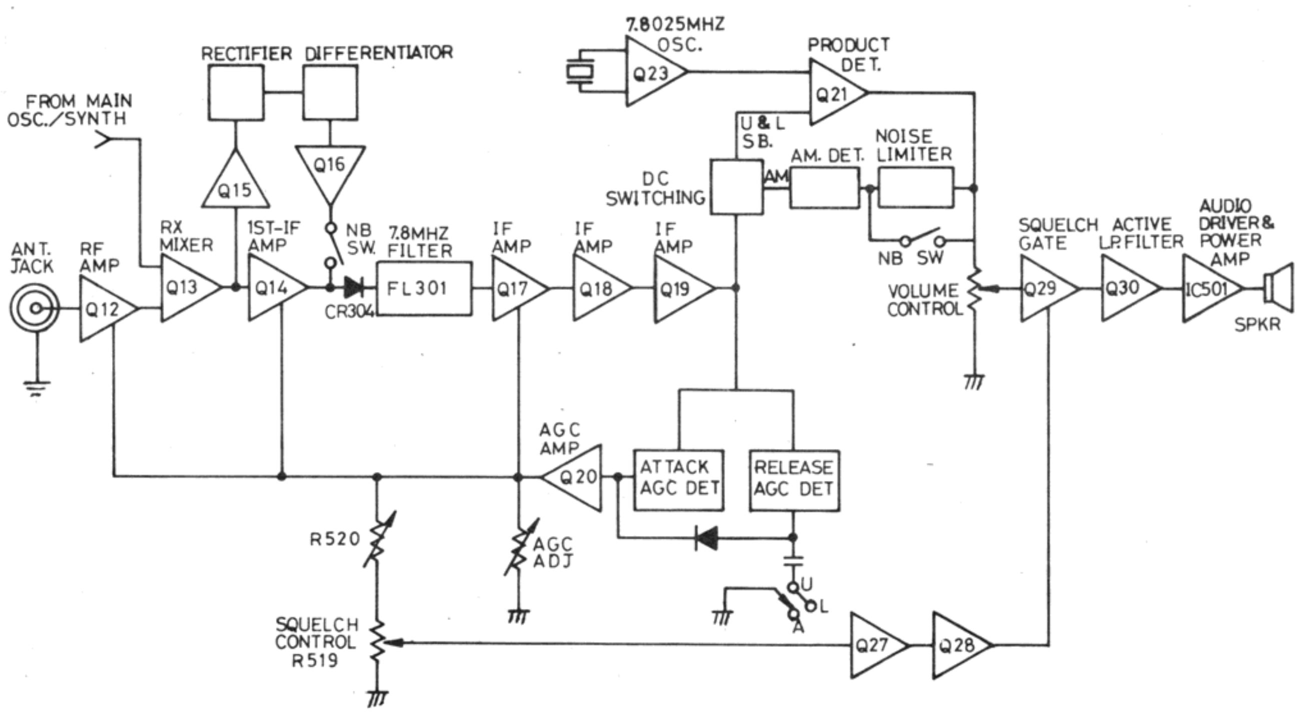

Figure 2-6 Receiver Block Diagram

2.5.4 Noise Blanker (Refer to Figure 2-7)

The noise blanker circuit consists of a rectifier, a differentiator, a noise amplifier, and a gate diode.

Impulse noise is picked up at the antenna and amplified by Q12. It is converted to 7.8 MHz IF by the mixer, Q13, and further amplified by Q15. Positive peaks of the impulse noise are rectified by CR307 and CR308, and then differentiated by C317 and R319. The differentiated pulses are then coupled to the gate of noise amplifier Q16 where they are amplified to a sufficient level to control gate diode CR304. When strong impulse noise is present in the received signal, CR304 becomes reverse biased and prevents the noise from passing through to the IF.

With the noise blanker switch in the OFF position, bias is removed from Q16 and the circuit has no control of CR304.

2.5.5 AM Detector and Noise Limiter (See Figure 2-8)

The IF signal through T307 is fed to envelope detector diodes CR317 and CR318, and then through the noise limiter to Q29.

Noise limiting is accomplished with the network consisting of R347 through R350, C345, and CR319. DC bias from the detector is applied to the anode of CR319 from the junction of divider R347/R348. It is also applied to the cathode via R349 and R350. This forward biases CR319 for normal signal amplitudes and the audio is coupled through CR319 to the base of squelch gate Q29.

When noise pulses are present in the signal, a higher negative bias is applied to the anode of CR319. However, the bias to the cathode is *not* increased because of the time constant presented by R349 and and C345. This reverse biases CR319 so that the noise pulses are clipped off.

Diode CR320 is a DC keying switch. In AM receive mode, CR320 is forward biased when ARB voltage is applied to its anode. Audio, from the AM detector and limiter, passes through to the audio amplifier. In SSB receive mode, CR320 is reversed biased when SRB voltage is applied to its cathode, and audio from the AM detector and limiter is blocked.

2.5.6 SSB Detector

The IF signal from Q19 is stepped down through T307 and coupled to the base of product detector Q21. The emitter of Q21 receives a 7.8025 MHz signal from the carrier oscillator. Detected audio from the collector of Q21 is then fed to Q29. Product detector Q21 is only active in SSB receive modes when SRB voltage is supplied.

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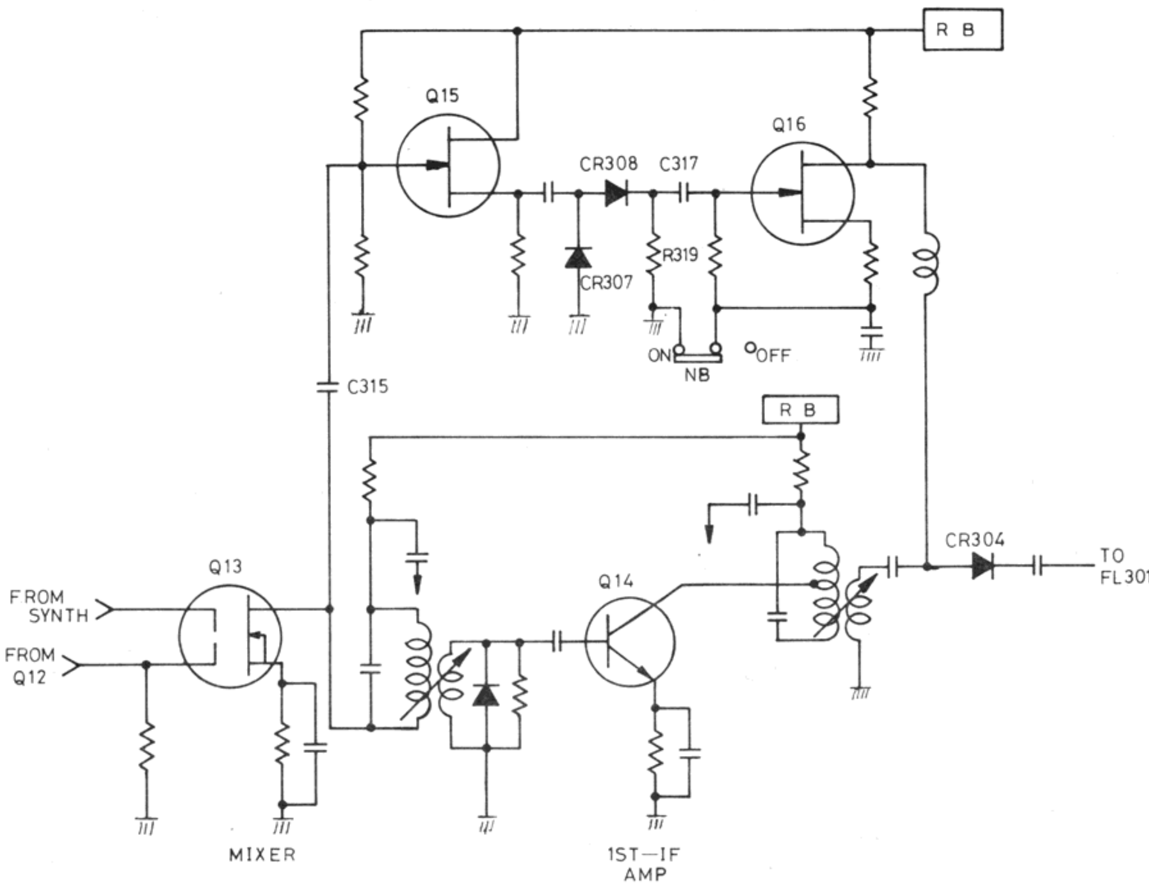


Figure 2-7 Noise Blanker Circuit

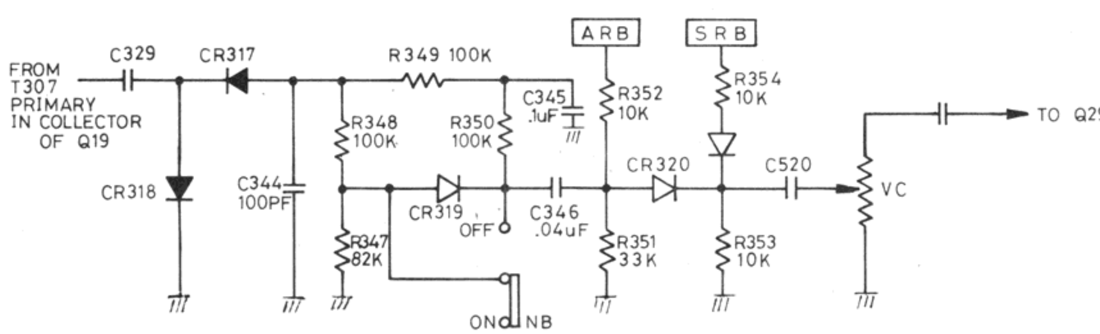


Figure 2-8 AM Detector and Noise Limiter Circuit

2.5.7 Automatic Gain Control (AGC) (Refer to Figure 2-9)

Since there is no carrier present on the SSB signal, special circuitry is required to maintain the AGC voltage at a proper level for both very weak and very strong signals. To accomplish this, two AGC detector circuits are used.

One circuit, for the weak signals, is called Attack AGC. These signals are coupled from T307 to detector diodes CR312 and CR313 via C330.

When a strong signal comes in, Attack AGC diodes CR312 and CR313 work quickly and charge C335 and C336. At the same time Release AGC diodes CR309 and CR310 charge C334. The charge on C334 reverse biases CR311, which remains in this condition until C334 has fully discharged through R337. This delay period is necessary to allow sufficient time for C335 and C336 to discharge, thereby maintaining a constant bias.

In receive, Q20 acts as the AGC amplifier. R361 in the source of Q20 is adjusted to set the AGC bias potential. This setting is fixed with the RF gain control set at maximum. RF gain, which is a front panel control, can then be used to vary the AGC bias.

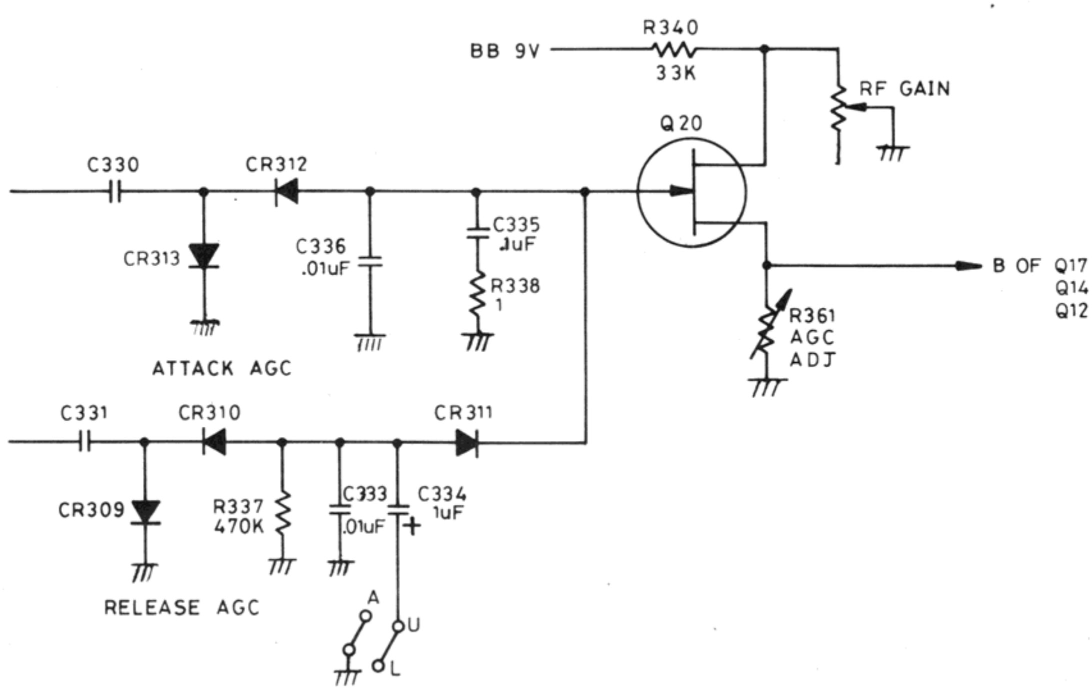


Figure 2-9 AGC Circuit

2.5.8 Squelch (Figure 2-10)

Squelch control R519 sets the operating bias of squelch amplifiers Q27 and Q28. Squelch gate Q29 controls the flow of audio from the detector to the audio amplifier.

With no signal being received, R519 is set to forward bias Q27 which turns on Q28. This places a positive voltage on the emitter of Q29 which gates off the audio. When a strong signal is received, the negative AGC voltage overrides the set level on Q27 cutting off that stage. This, in turn, cuts off Q28 removing the positive voltage from the emitter of Q29 and the audio is gated on.

2.5.9 Audio

The audio signal, from squelch gate Q29, is coupled to the audio amplifier through active low-pass filter Q30.

Integrated circuit IC501 is a self contained audio amplifier consisting of a driver and push-pull final stage. The output of IC501 is coupled through a matching transformer to the speaker.

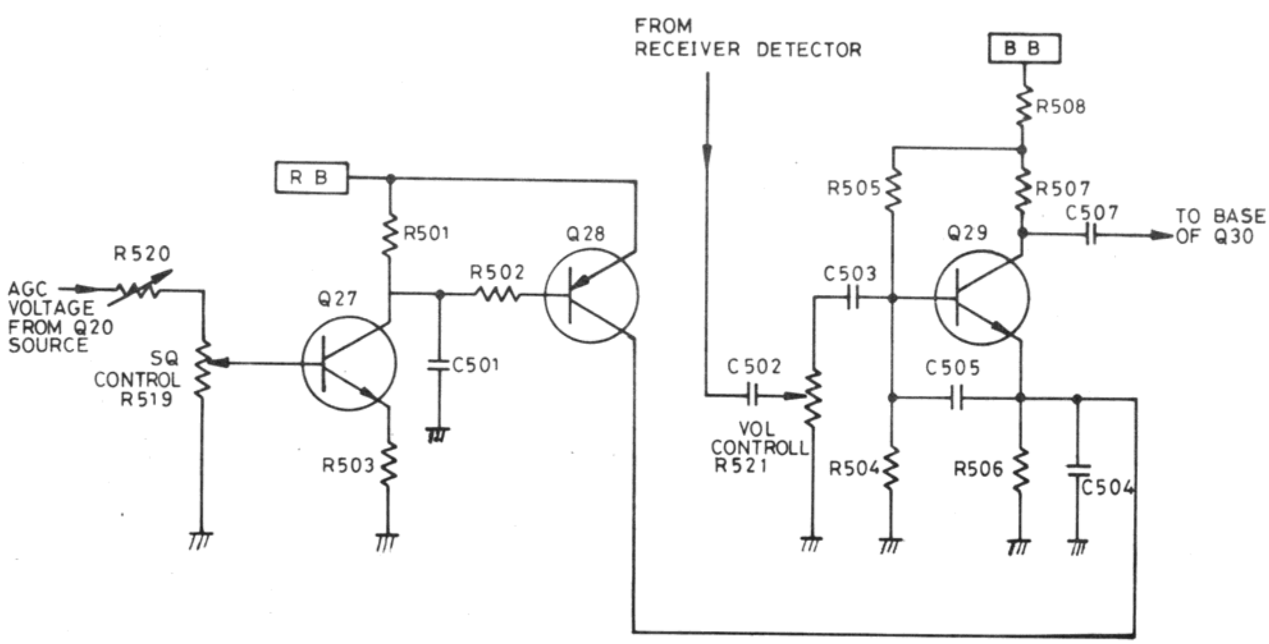


Figure 2-10 Squelch Circuit

2.6 ANTENNA SWITCHING

In the SIDETALK 1000, antenna switching is accomplished by DC switching diodes, CR101 and CR102, instead of relay switch contacts. This method eliminates the possibility of RF leakage through the switch.

In the normal receive mode (see Figure 2-11), RB voltage is applied to the cathode of CR101, reverse biasing that diode. At the same time TB is removed from the anode of CR102, reverse biasing that diode. With CR102 reverse biased, the antenna is effectively disconnected from the transmitter final stage, while the receiver RF amplifier is connected to the antenna via C301, C103, C102, and L102.

When the P–T–T switch is pressed, TB is applied to the anode of CR102 forcing it into conduction. The path is then open from the TX final stage to the antenna via CR102, C102, and L102. At the same time RB is removed from the cathode of CR101, forward biasing that diode. With CR101 in conduction, the RF input to the receiver amplifier is shunted to ground through C301, CR101, and C104, effectively disconnecting it from the antenna.

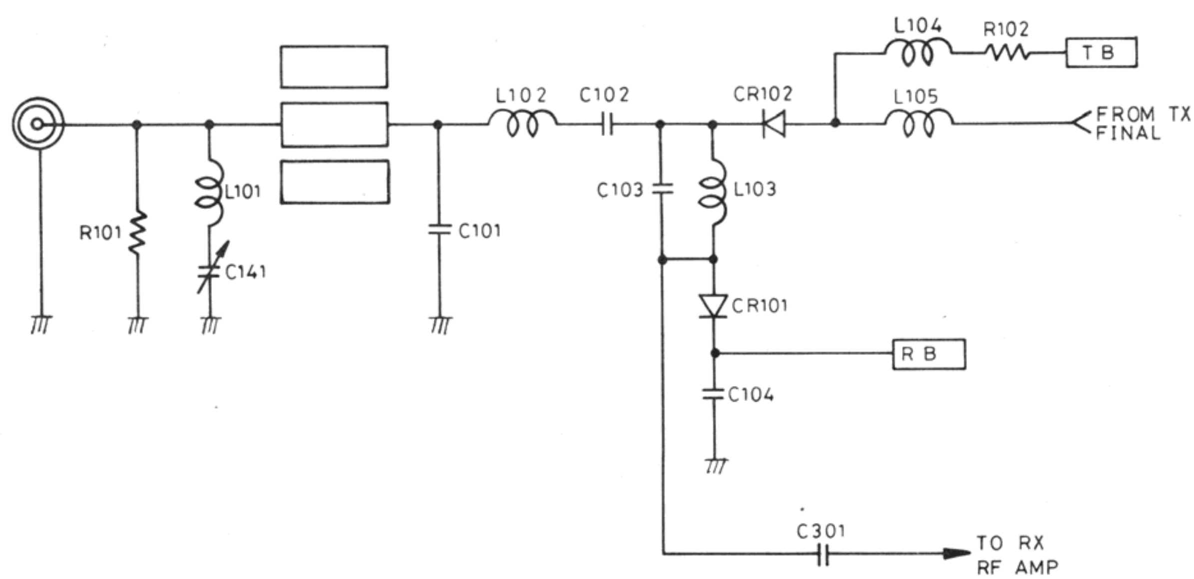


Figure 2-11 Antenna Switching Circuit

NOTES

SECTION III
MAINTENANCE

3.1 GENERAL

This section contains maintenance instructions for the PACE Models SIDETALK 1000M and B. The procedures given in this section assume a general knowledge of AM type communications transceivers and a familiarization with transistors and integrated circuits.

3.1.1 Tools and Techniques

A list of recommended tools and test equipment required for maintenance operations is presented in Table 3-1. Aside from the items listed, hand tools and equipment commonly used in the maintenance of electronic equipment are sufficient for maintenance operations.

It is recommended that maintenance adjustments and repairs be performed only by experienced personnel familiar with the equipment. In some cases, minor changes in voltage levels may be corrected by adjusting potentiometers located in the affected circuits. Standard practices in the electronic industry should be observed in checking and/or replacing system components.

3.1.2 Parts Identification

For PC board component location, refer to illustrations and schematics in Section V.

3.2 PREVENTIVE MAINTENANCE

The receiver requires minimal maintenance due to the nonmechanical nature of the equipment. However, a preventive maintenance program consisting of electrical checks is recommended as an aid in obtaining maximum operating efficiency from the system.

3.3 CORRECTIVE MAINTENANCE

Corrective maintenance operations entail transceiver checks and adjustments which are not part of preventive maintenance procedures. Operational malfunctions which require corrective maintenance may usually be corrected by an adjustment or PC board replacement. If necessary to make repairs at the component level, such repairs should be made by maintenance technicians who are familiar with the equipment and electronic repair techniques. Refer to Section IV for alignment and adjustment procedures.

3.4 TROUBLESHOOTING

It is recommended that a functional analysis approach be used to locate the cause of the transceiver malfunction. Troubleshooting can be simplified by reference to the schematic diagrams in Section V.

TABLE 3-1
TEST EQUIPMENT REQUIRED

Item	Model or Description
Power Source	Regulated 13.8 V DC Power Supply (Hewlett-Packard Model 624B or equivalent)
Wattmeter	50 Ω, 25 W (Bird Electronics Model 43 or equivalent)
Audio Generator	Frequency range: 200 Hz to 5 kHz minimum
Frequency Counter	DC to 30 MHz minimum (Hewlett-Packard Model 4245L or equivalent)
Oscilloscope	30 MHz bandpass or DC coupled scope with detector (Tektronix Model 545B or equivalent)
Vacuum Tube Voltmeter	1 mV to 50 V AC or more (Hewlett-Packard Model 410B or equivalent)
RF Signal Generator	Capable of tuning 455 kHz, 7.8 MHz and 27 MHz CB frequencies (Hewlett-Packard Model 606B or equivalent)
DC Voltmeter (Multimeter)	High impedance input (RCA WV-98C or equivalent)
RF Probe*	For use with multimeter

*If no probe is available for the multimeter, one may be fabricated as shown in Figure 3-1.

Standard troubleshooting procedures, such as signal injection and signal tracing, should be used in locating faulty circuits. Once the trouble has been isolated to a particular circuit, the defective component can be localized by voltage and resistance measurements. Refer to voltage charts in Tables 3-2 through 3-8.

Before proceeding with the troubleshooting procedures, the entire installation should be checked for defective antenna connections and loose or broken supply cables and plugs.

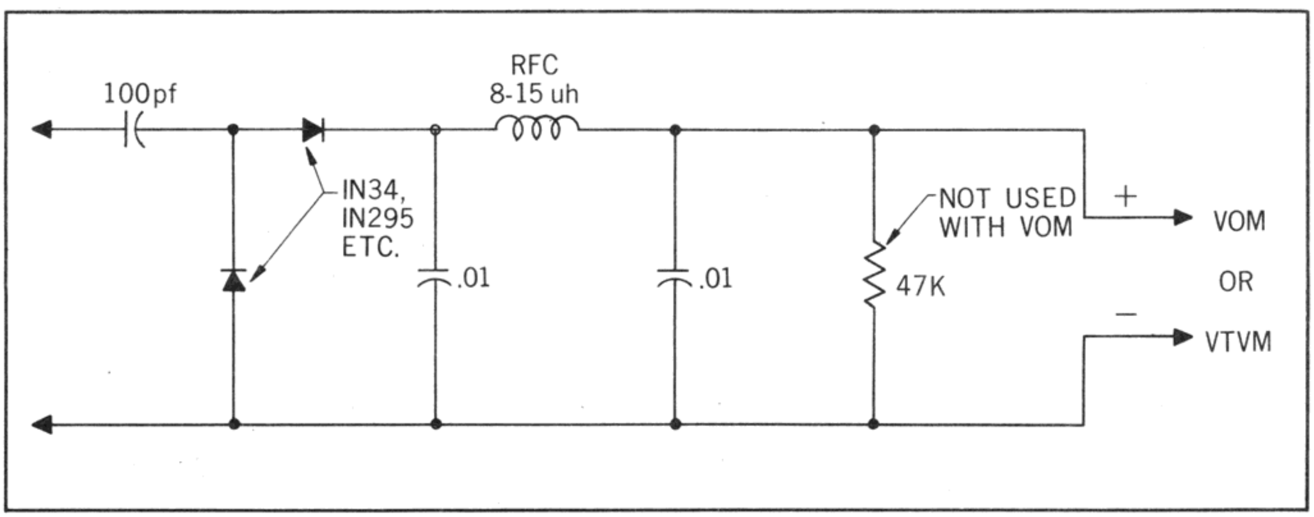


Figure 3-1 RF Probe

Static voltages were measured with a 20 k ohm/volt voltmeter through a 22 μH inductor. All voltages are positive and have a tolerance of ± 20%.

TABLE 3-2
OSCILLATOR AND SYNTHESIZER STATIC BIAS MEASUREMENTS

Circuit Function	Mode	Transistor	DC Voltage in Volts			
				Emitter	Base	Collector
7.8025 MHz Oscillator	LSB	Q23		3.0	3.1	6.6
7.5 MHz Oscillator	LSB	Q10		2.1	2.2	9.0
11.8 MHz Oscillator	LSB	Q11		2.0	2.0	7.5
19 MHz Amplifier	LSB	Q8		0.4	1.0	6.0
34 MHz Amplifier	USB	Q6		0.4	1.0	6.3
			Source	Gate 1	Gate 2	Drain
19 MHz Mixer	LSB	Q9	1.1	0	–	8.5
34 MHz Mixer	USB	Q7	0	0	0	12.5

TABLE 3-3
OSCILLATOR AND SYNTHESIZER SIGNAL MEASUREMENTS

Circuit Function	Remarks	Measured at	Output (RMS)
7.8025 MHz Output	SSB Mode	TP2	1.0 V
7.5 MHz Output	11.8 MHz Xtal Off	Q10 Emitter	2.4 V
11.8 MHz Output	7.5 MHz Xtal Off	Q11 Emitter	1.1 V
19 MHz Output	LSB Mode	TP3	1.4 V
34 MHz Output	USB Mode	TP3	1.4 V

TABLE 3-4
TRANSMITTER STATIC BIAS MEASUREMENTS

Circuit Function	Mode	Transistor	DC Voltage in Volts			
				Emitter	Base	Collector
27 MHz Amplifier	AM	Q4		0.6	1.2	8.9
27 MHz Pre-Driver	AM	Q3		0.1	0.9	13.2
27 MHz Driver	AM	Q2		0	0.7	6.0
27 MHz Final	AM	Q1		0	0.7	6.0
			Source	Gate 1	Gate 2	Drain
27 MHz Mixer	AM	Q5	0	0	0.6	7.0

TABLE 3-5
TRANSMITTER SIGNAL MEASUREMENTS

Circuit Function	Mode	Measured at	Output (RMS)
Mixer Output	AM	Q4 Base	180 mV
1st Amplifier Output	AM	Q3 Base	450 mV
Pre-Driver Output	AM	Q2 Base	750 mV
Driver Output	AM	Q1 Base	2.9 V
Final Output	AM	Q1 Collector	7.0 V
Final Output	AM	Antenna Jack	12.5 V

TABLE 3-6
RECEIVER STATIC BIAS MEASUREMENTS

Circuit Function	Transistor	Control Setting	DC Voltage in Volts			
			Emitter	Base		Collector
27 MHz Amplifier	Q12	–	1.0	1.6		5.5
7.8 MHz Amplifier	Q14	–	1.0	1.3		9.0
7.8 MHz Amplifier	Q17	–	1.0	1.6		8.5
7.8 MHz Amplifier	Q18	–	1.0	1.6		8.5
7.8 MHz Amplifier	Q19	–	0.9	1.4		8.5
			Source	Gate 1	Gate 2	Drain
Mixer	Q13	–	0.2	0.25	0.2	7.5
Noise Amplifier	Q15		4.5	4.4	–	9.0
Noise Amplifier	Q16	NB ON	8.8	8.0	–	8.6
		NB OFF	0.4	0	–	7.5
AGC Amplifier	Q20		1.7	0	–	4.0

TABLE 3-7
RECEIVER SIGNAL MEASUREMENTS
(All Measurements Made at Q19 Collector in AM Mode)

Test Description	Input			Output (RMS)
	Frequency	Signal Level	Injection	
IF Stage Gain	7.8 MHz	1100 μV	Q19 Base	100 mV
IF Stage Gain	7.8 MHz	50 μV	Q18 Base	100 mV
IF Stage Gain	7.8 MHz	17 μV	Input of FL-301	100 mV
RF/IF Overall Gain	27 MHz	10 μV	Q13 Gate 1	100 mV
RF/IF Overall Gain	27 MHz	4 μV	Q12 Emitter	100 mV

TABLE 3-8
AUDIO STATIC BIAS MEASUREMENTS

Circuit Function	Mode	Transistor	Control Setting	DC Voltage in Volts		
				Emitter	Base	Collector
Squelch Amplifier	RX	Q27	SQ. Max.	0	0.7	0.01
			SQ. Min.	0	0	8.0
Squelch Amplifier	RX	Q28	SQ. Max.	9.0	8.0	9.0
			SQ. Min.	9.0	6.8	1.1
Squelch Gate	RX	Q29	SQ. Max.	9.0	3.0	8.5
			SQ. Min.	1.1	1.7	3.5
Active LP Filter	RX	Q30	–	3.5	3.5	9.0
Microphone Amplifier	TX	Q26	–	3.6	3.5	9.0
				Source	Gate	Drain
Microphone Attenuater	TX	Q25	–	0	0	3.4

Audio Final	IC1	Pin	DC Voltage	Pin	DC Voltage
		1	13.0	6	2.0
		2	12.5	7	3.5
		3	3.9	8	1.0
		4	8.5	9	0
		5	1.1	10	6.9

3.5 MODULATION CHECK

There are three satisfactory methods of checking modulation:

1. A high frequency (30 MHz) oscilloscope, which can be directly coupled by a small capacitor to the antenna jack.
2. A low frequency scope with provisions for direct connection to the deflection plates. A twisted pair, with a 1½ turn link on the end, should be used for coupling. Connect the open end to the deflection plates and then orient the link near the power amplifier coils in the transceiver to obtain a deflection on the screen.
3. A linear detector and a DC oscilloscope would probably be the easiest method to use, and the most accurate, unless a high frequency oscilloscope is available. A suitable detector is shown in Figure 3-2A.

Inexpensive modulation indicators of the meter type have been found to be of irregular accuracy and and of no value in checking for parasitics, etc., and, therefore, should not be relied upon.

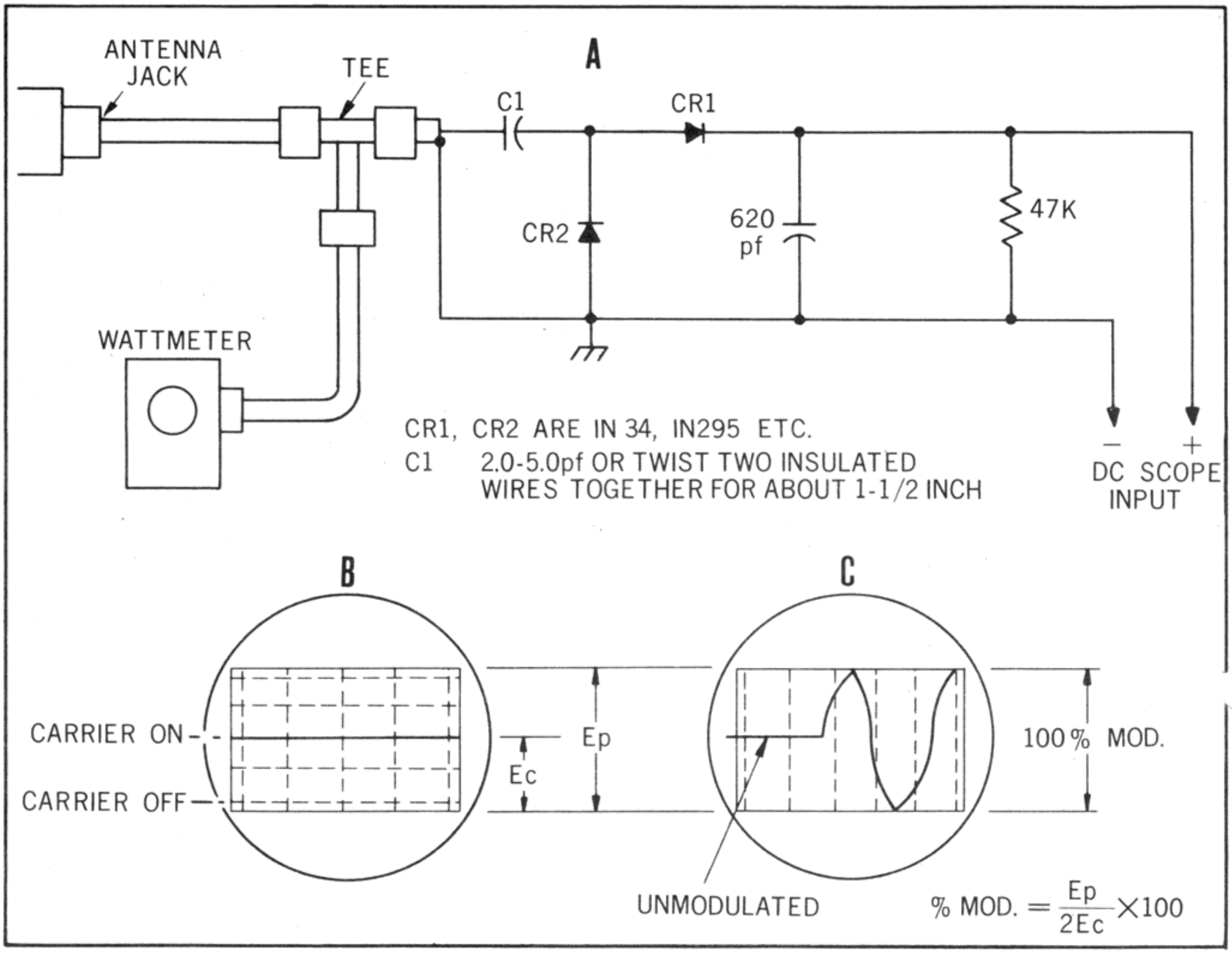


Figure 3-2 Modulation Detector

If a high frequency scope is used, connect the probe to the antenna jack directly through a 20-50 pF capacitor. While transmitting a carrier only, adjust the gain to produce a pattern on the scope of about one-half the usable screen area. See Figure 3-3.

Apply modulation and observe the maximum height of the modulated waveform. For 100% modulation, EP = 2 EM, etc. It is more important that the peak (positive going) portion be analyzed since the "trough" or negative going portion will always perform correctly when the peaks are present.

If a low frequency scope using a direct connection to the plates is employed, the same adjustment procedures apply.

To use the DC scope and detector of Figure 3-2A, adjust the position control with the carrier off to place the trace on a reference line near the bottom of the scope face. See Figure 3-2B. Then feed the unmodulated carrier to the detector and adjust the gain to place the trace in the center of the scope face. It may be necessary to switch the transmitter off and on several times to adjust the trace properly, since on most scopes the position and gain controls will interact.

A 100% modulated transmitter will produce a peak-to-peak envelope equal to twice the shift between the carrier and no carrier traces. See Figure 3-2C. When checking modulation, do not over-drive. Whistle into the microphone with increasing loudness so that maximum modulation is reached without clipping.

Talking into the microphone in a normal manner should produce continuous peaks of 80-95% modulation.

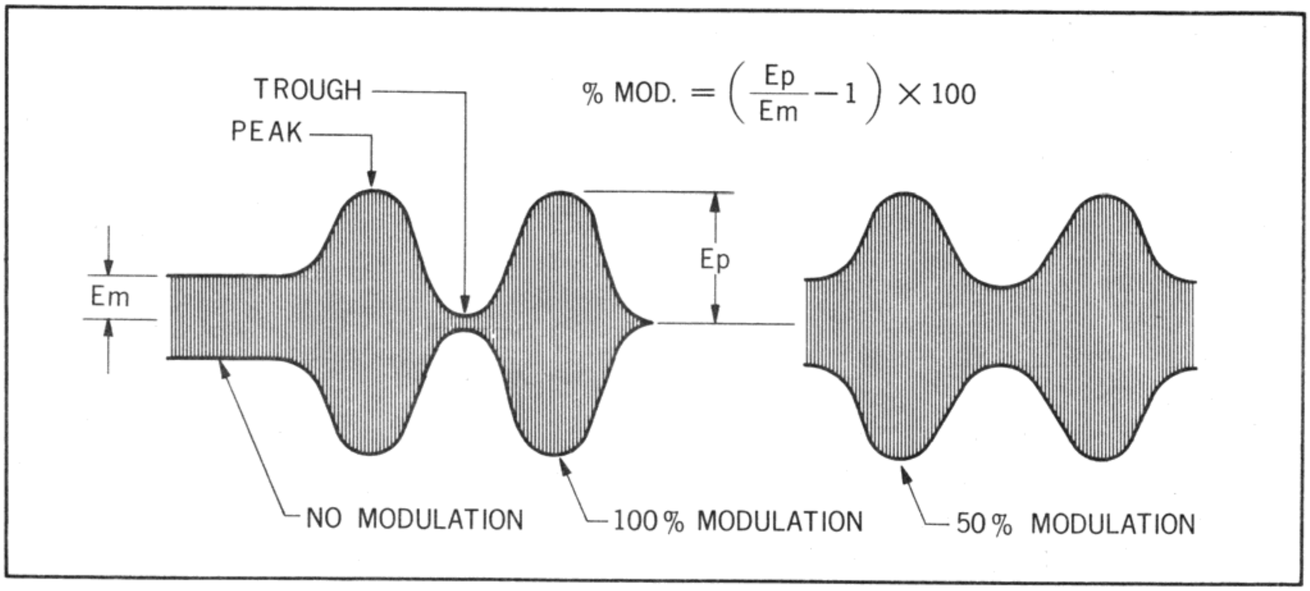


Figure 3-3. Direct Modulation Monitor

PACE

NOTES

SECTION IV
ADJUSTMENT AND ALIGNMENT

4.1 GENERAL

The PACE Model SIDETALK 1000 Transceiver was factory aligned to provide optimum performance. It will not normally require realignment unless major components have been replaced or if the receiver sensitivity has dropped below the specified voltage for 20 dB quieting.

NOTE

Transmitter tuning adjustments must be made by a technician holding an appropriate FCC license and the results entered in the station radio log.

It is recommended that the transceiver be returned to the factory for realignment. However, correct alignment procedures are given in the following paragraphs where this is not feasible.

4.2 TEST EQUIPMENT

Every effort has been made to keep the required instruments necessary to align and service as simple as possible. It must be realized that the degree of accuracy attained in measurement is directly related to the quality of instruments used. Where a lower quality instrument than the one suggested is used, allowance must be made for possible error in readings. Refer to Table 3-1 for a list of recommended test equipment.

4-3 OSCILLATOR AND SYNTHESIZER ALIGNMENT

4.3.1 Carrier Frequency

1. Set the mode switch to LSB.
2. Connect the frequency counter to TP–2 (see Figure 4-1).
3. Adjust C415 for a reading, on the frequency meter, of 7.8025 MHz ± 10 Hz.

4.3.2 Doubler Frequency Alignment

1. Set the mode switch to USB.
2. Connect the frequency counter (through a 15 MHz bandpass filter) to TP2.
3. Connect an RF millivoltmeter to the same point.
4. Adjust T402 and T403 for maximum output indication on the millivoltmeter.

NOTE

This step may have to be repeated when aligning the 34 MHz synthesizer circuit.

5. The frequency counter should indicate 15.605 MHz.

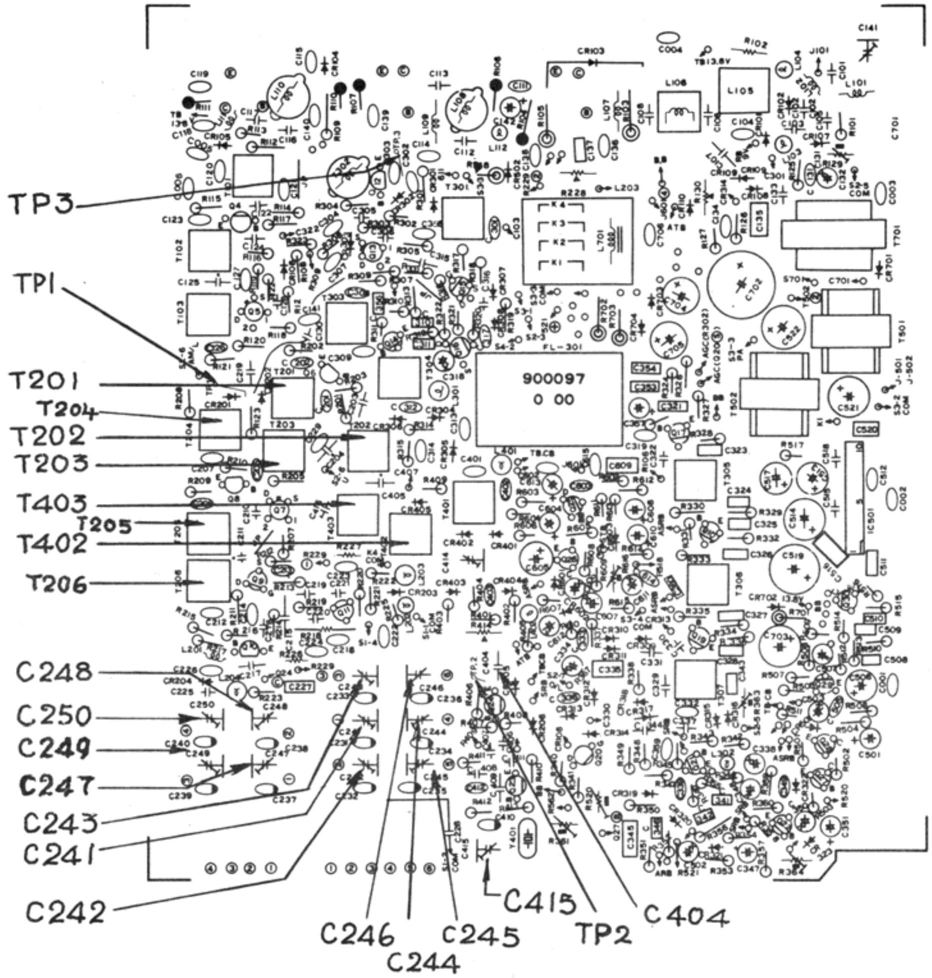


Figure 4-1 Oscillator and Synthesizer Adjustment Locations

4.3.3 19 MHz Synthesizer Alignment

1. Set the mode switch to LSB.
2. Set the clarifier control to its center position.
3. Connect the frequency counter to TP1 (junction of CR201 and CR202).
4. Connect the RF millivoltmeter to TP1.
5. Preset trimmer capacitors C241 through C250 (see Figure 4–1) to their approximate mid-positions.
6. Adjust T206, T205, and T204 for maximum output indication on the millivoltmeter.

7. Adjust trimmer capacitors C242 through C250 for exact frequencies listed in Table 4-1.

NOTE

If the exact frequencies cannot be obtained, C241 may be adjusted to bring the frequencies into specs.

TABLE 4-1
SYNTHESIZER FREQUENCY ADJUSTMENTS

Channel Setting	Trimmer to be Adjusted	Frequency in MHz*
1	C247	19.1625
2	C248	19.1725
3	C249	19.1825
4	C250	19.2025
8	C242	19.2525
12	C243	19.3025
16	C244	19.3525
20	C245	19.4025
23	C246	19.4525

*All frequencies should be within ± 50 Hz.

4.3.4 34 MHz Synthesizer Alignment

1. Set the mode switch to USB.
2. Connect the frequency counter to TP1.
3. Connect the RF millivoltmeter to TP1.
4. Set the channel selector switch to Channel 13.
5. Carefully align T201, T202, and T203 for maximum output indication on the millivoltmeter.
6. Check frequencies on all channels. They should correspond to those listed in Column B of Table 2-2.
7. Adjust T402 and T403 for maximum output indication on the millivoltmeter.

4.3.5 19 MHz Synthesizer Alignment for AM Receiver

1. Set the mode switch to AM.
2. Check frequencies on all channels. They should correspond to those listed in Column C of Table 2-2.

4.3.6 Clarifier Limit Control Adjustment

1. Set the mode switch to LSB.
2. Connect the frequency counter to TP1.
3. Set the clarifier control to its mid position.
4. Set the channel selector switch to Channel 13. A reading of 19.3125 MHz ± 50 Hz should be obtained.
5. Rotate the clarifier control fully clockwise.
6. Adjust trimmer potentiometer R226 for a reading of 600 Hz higher than that obtained in step 4.
7. Rotate the clarifier control fully counterclockwise.
8. Adjust trimmer potentiometer R227 for a reading of 600 Hz lower than that obtained in step 4.
9. Reset the clarifier control to its mid position.

4.4 TRANSMITTER ALIGNMENT

Transmitter adjustment should not be attempted unless very low power, instability, or audio distortion is present. Follow the tuning procedure *carefully*. Failure to do so may result in excessive dissipation with resultant loss of a driver or output unit. Remember that when a battery or battery eliminator is used, the current supply is nearly unlimited, and it is therefore inadvisable to operate the transceiver without the fused power cord.

NOTE

The synthesizer oscillator circuit must be properly aligned (Section 4.3) prior to transmitter alignment.

4.4.1 Preliminary Setup

1. Connect a wattmeter and oscilloscope to the antenna jack as shown in Figure 3-2.
2. Connect an audio oscillator to the microphone jack, and set the oscillator for a frequency of 1 kHz. The transmitter switch adapter shown in Figure 4-2 may be used for this purpose.
3. Preset trimmers (see Figure 4-3) in the transceiver as follows:
   a. Adjust ALC trimmer R130 to its maximum clockwise position (towards rear of transceiver).
   b. Adjust OML trimmer R616 to its maximum clockwise position (towards rear of transceiver).
   c. Set 54 MHz trap C141 to its approximate mid-position.

4.4.2 LSB Transmitter Alignment

1. Set the mode switch to LSB.
2. Set the channel selector switch to Channel 13.
3. Turn the transmitter on and adjust the audio oscillator output for a reading of about 6 to 7 watts on the wattmeter.
4. Adjust T103, T102, T101, L110, L108, and L106 (see Figure 4-3) for maximum output indication on the wattmeter.

NOTE

Adjust audio oscillator output as required to maintain an output of 6 to 7 watts during this step.

5. Adjust the audio oscillator output until the transmitter output saturates (approximately 15 watts).
6. Readjust L108 and L106 for a maximum output indication on the wattmeter.

4.4.4 Carrier Suppression

1. Reset the audio oscillator output for an output of 1 watt on the wattmeter.
2. Adjust C414 and R414 until the envelope of the RF output just flattens out as observed on the oscilloscope.

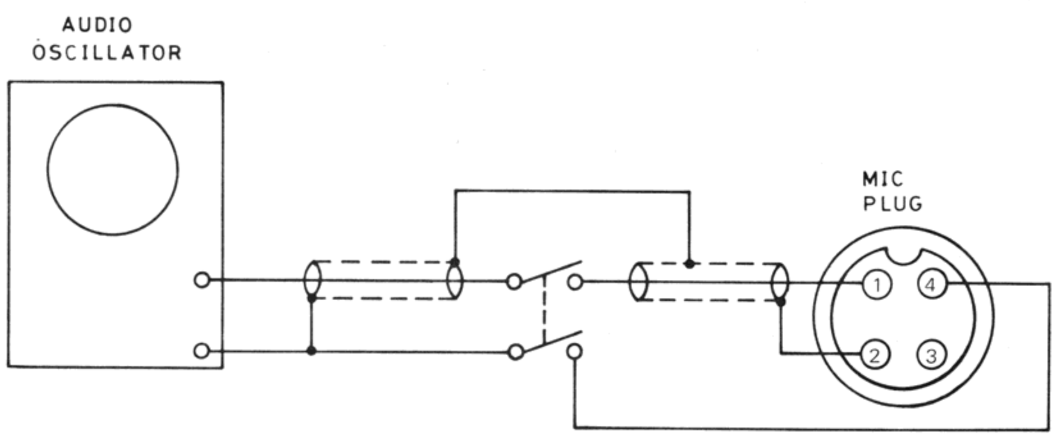


Figure 4-2 Transmitter Switch Adapter

4.4.5 USB Transmitter Alignment

1. Leave the channel selector switch on Channel 13 and set the mode switch to USB.
2. Reset the audio oscillator output for a reading of about 6 to 7 watts on the wattmeter.
3. Adjust T403, T402, T203, T202, and T201 (see Figure 4-3) for a maximum reading on the wattmeter.
4. Increase the audio oscillator output to confirm that the transmitter output is at least 15 watts.

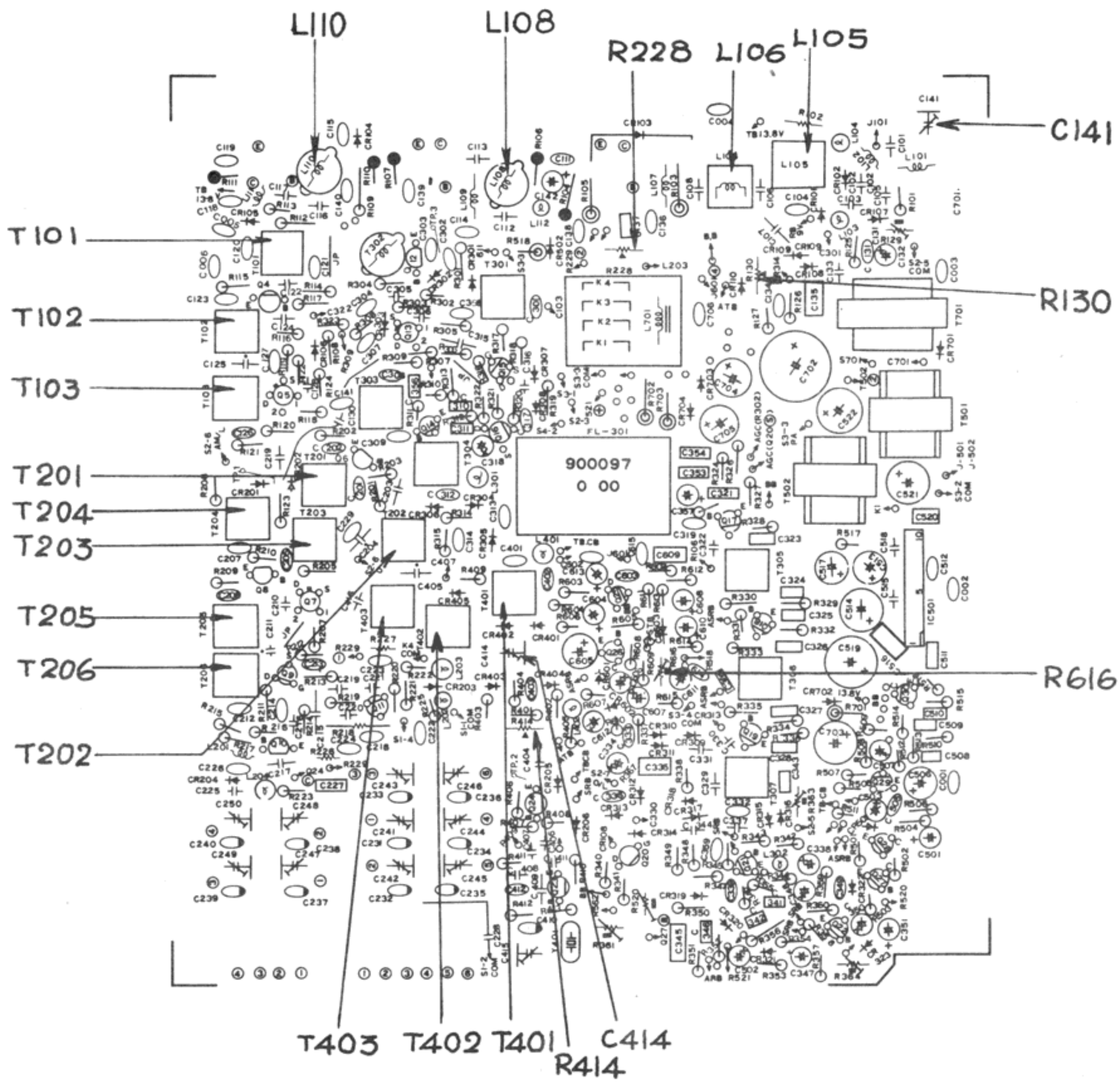


Figure 4-3 Transmitter Adjustment Locations

4.4.6 SSB Transmitter Final Check

1. Leave the channel selector switch on Channel 13 and set the mode switch to LSB.
2. Reset the audio oscillator output for a reading of 4 watts on the wattmeter.
3. Set the channel selector switch to Channel 1 and check the wattmeter reading. It should be more than 2.5 watts but less than 4 watts.
4. Repeat step 3 for Channel 23.
5. If the conditions specified in 3 and 4 have not been satisfied, switch to Channel 13 and readjust T206, T205, T204, T103, and T102 for maximum output.
6. Set the mode switch to USB and repeat steps 2 through 4.
7. If the conditions specified in 3 and 4 have not been satisfied, switch to Channel 13 and readjust T203, T202, and T201 for maximum output.

4.4.7 AM Transmitter Final Check

1. Set the mode switch to AM and the channel selector switch to Channel 13. With no audio signal applied, the carrier output should be between 3.2 and 4 watts. Apply an audio signal and confirm that there is positive (upward) modulation.
2. Repeat step 1 for Channels 1 and 23.
3. If the specified conditions have not been satisfied, readjust L106 on Channel 13.

NOTE

Further adjustment may be made, if necessary, by adjusting L105. This can be done by carefully spreading (or compressing) the winding using a nonmetallic flat blade alignment tool.

4.4.8 Automatic Level Control (ALC) Adjustment

1. Set the mode switch to LSB and the channel selector switch to Channel 13.
2. Adjust the audio generator output to produce a reading of about 15 watts on the wattmeter.
3. Adjust R130 for a 12 watt indication on the wattmeter.

NOTE

12 watts is the maximum legal output allowed by the FCC for SSB. R130 may be adjusted to retain this output.

4.4.9 RF Power Meter Adjustment

Continuing from step 3 of 4.4.8:

Check the power reading on the "S"/RFO meter. This should be 12 watts. If necessary, adjust trimmer potentiometer R219 to obtain this reading.

4.4.10 Overmodulation Limiter (OML) Adjustment

1. Turn the mode switch to AM and the channel selector switch to Channel 13.
2. Adjust the audio generator output to produce 50% modulation (see Figure 3-3).
3. Increase the audio level by 20 dB. This should result in overmodulation.
4. Adjust R616 for a 100% modulation display.

This completes the transmitter alignment procedures. Disconnect all equipment connected in Section 4.4.1 and restore the transceiver to normal operation.

4.5 RECEIVER ALIGNMENT

Complete receiver alignment can be accomplished using the transceiver's "S" meter as an indication device.

4.5.1 AM Receiver Alignment (Figure 4-4)

1. Turn the mode switch to AM.
2. Connect the signal generator to the base of Q19 through a 0.047 μF ceramic capacitor. Tune the signal generator to 7.8 MHz, with 30% modulation of a 1 kHz signal. Increase the signal generator output level to obtain an approximate mid-scale indication on the "S" meter.
3. Adjust T307 for a peak reading on the "S" meter.

NOTE

For this and subsequent receiver alignment steps, reduce the signal generator output, as necessary, to keep the "S" meter at its approximate mid-scale.

4. Connect the signal generator through the 0.047 μF capacitor to the base of Q18.
5. Adjust T306 for a peak reading on the "S" meter.
6. Connect the signal generator through the 0.047 μF capacitor to Gate 1 of Q13.

7. Adjust T304 and T303 for a peak reading on the "S" meter.
8. Connect the signal generator output directly to the antenna connector. Tune, the signal generator to 27.115 MHz, with 30% modulation of a 1 kHz signal.
9. Adjust T301 and T302 for a peak reading on the "S" meter.
10. For optimum receiver performance readjust T301 through T305 with the signal applied in step 8.

4.5.2 AM "S" Meter Adjustment

1. Set the mode selector switch to AM.
2. Connect the signal generator output directly to the antenna connector. Tune the signal generator to 27.115 MHz with no modulation.
3. Turn the channel selector switch to Channel 13.
4. Set the signal generator output level to 100 μV.
5. Adjust trimmer potentiometer R363 for an S9 reading on the "S" meter.

4.5.3 SSB "S" Meter Adjustment

1. Set the mode selector switch to LSB.
2. Connect the signal generator output directly to the antenna connector. Tune the signal generator to 27.1135 MHz with 1 kHz modulation.
3. Turn the channel selector switch to Channel 13.
4. Set the signal generator output level to 100 μV.
5. Adjust trimmer potentiometer R364 for an S9 reading on the "S" meter.

4.5.4 Tight Squelch Adjustment

1. Connect an 8-ohm dummy load and an AC VTVM to the external speaker jack, through a miniature phone plug.
2. Connect the signal generator output directly to the antenna connector. Tune the signal generator to 27.115 MHz with 30% modulation of a 1 kHz signal.
3. Turn the channel selector switch to Channel 13.
4. Turn the squelch control fully clockwise.
5. Set the signal generator output to 1000 μV.
6. Adjust trimmer potentiometer R520 until an indication of audio output just starts to appear on the VTVM.

4.5.5 AGC Adjustment

1. Connect a DC voltmeter to the base of transistor Q12.
2. Adjust trimmer potentiometer R361 for a reading of +1.6 volts on the meter.

4.5.6 SSB Receiver Check

1. Connect the signal generator directly to the antenna connector.
2. Tune the signal generator to 27.1165 MHz (unmodulated). Set the mode switch to USB. A beat tone of approximately 1.5 kHz should be heard from the speaker.
3. Tune the signal generator to 27.1135 MHz (unmodulated). Set the mode switch to LSB. A beat tone of approximately 1.5 kHz should be heard from the speaker.

This completes the entire alignment procedure.

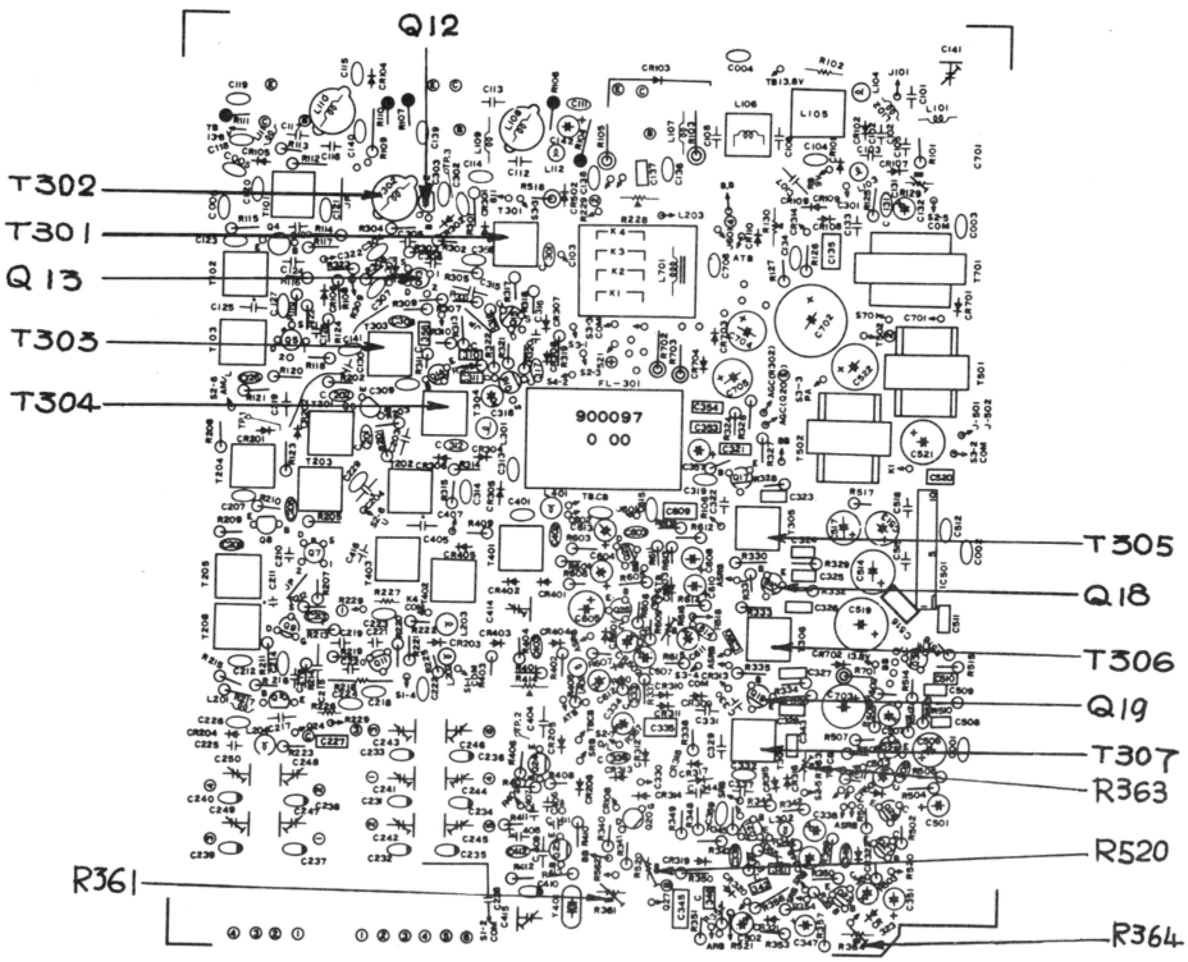


Figure 4-4 Adjustment Location for Receiver Alignment

SECTION V
ILLUSTRATIONS AND PARTS LIST

5.1 GENERAL

The schematic and parts locator in this section are for the PACE Models SIDETALK 1000M and 1000B Transceivers. Part numbers and descriptions are keyed to schematic reference numbers and are listed for these components.

TABLE 5-1
PARTS LIST

BOTH MODELS

Reference Number	Description	Part Number
CAPACITORS*		
C135, 335, 345	Mylar, 0.1 μF	IP 22–0047
C136, 227, 310, 311, 321, 323 thru 328, 340 thru 343, 346, 353 thru 356, 511, 609	Mylar, 0.04 μF	IP 22–0018
C141, 414	Variable, 10 pF	IP 22–0045
C142	Electrolytic, 22 μF/16 V	IP 22–0042
C241 thru 246	Variable, 30 pF	IP 22–0021
C247 thru 250	Variable, 40 pF	IP 22–0046
C312, 318, 334, 338, 347, 350, 351, 352, 357, 501, 502, 503, 604, 606, 607, 612, 613	Electrolytic, 1 μF/50 V	IP 22–0001
C348, 608	Electrolytic, 10 μF/16 V	IP 22–0004
C415	Variable, 20 pF	IP 22–0020
C506, 513, 517, 605	Electrolytic, 47 μF/16 V	IP 22–0006
C507	Electrolytic, 0.22 μF	IP 22–0044
C508, 509	Mylar, 0.02 μF	IP 22–0017
C510	Mylar, 0.005 μF	IP 22–0048
C514, 521, 522, 703, 704, 705	Electrolytic, 220 μF/16 V	IP 22–0009
C516, 520	Mylar, 0.047 μF	IP 22–0033
C519	Electrolytic, 470 μF/16 V	IP 22–0010
C610, 611	Electrolytic, 4.7 μF/16 V	IP 22–0003
C702	Electrolytic, 2200 μF/16 V	IP 22–0043
RESISTORS*		
R102	150 Ohm 1 W	IP 23–0010
R103	200 Ohm 2 W	IP 23–0011
R104	5.6 Ohm 1/2 W	IP 23–0017
R105	100 Ohm 2 W	IP 23–0012
R111	2.2 Ohm 1/2 W	IP 23–0018
R129	Potentiometer, Trimmer, 100 k Ohm	IP 24–0002
R130	Potentiometer, Trimmer, 10 k Ohm	IP 24–0003
R218	100 Ohm 1 W	IP 23–0013

* Order all unlisted parts by description and reference number

R227, 363	Potentiometer, Trimmer, 10 k Ohm	IP 24–0005
R228	Potentiometer, Trimmer, 100 k Ohm	IP 24–0013
R361	Potentiometer, Trimmer, 5 k Ohm	IP 24–0035
R362	Potentiometer, RF GAIN, 5 k Ohm-A	IP 24–0036
R364, 520	Potentiometer, Trimmer, 50 k Ohm	IP 24–0015
R414	Potentiometer, Trimmer, 500 Ohm	IP 24–0023
R518	.5 Ohm 1 W	IP 23–0014
R521	Potentiometer, VOLUME, 10 k Ohm-D	IP 24–0001
R616	Potentiometer, Trimmer, 1 k Ohm	IP 24–0007
R701, 702	56 Ohm 1 W	IP 23–0015
R703	33 Ohm 1 W	IP 23–0016

DIODES, INTEGRATED CIRCUITS, AND TRANSISTORS

CR101, 102	Diode, 10D-4	IP 20–0022
CR103, 104, 105	Diode, 1S990S	IP 20–0018
CR106, 201, 202, 205, 206, 306, 310, 311, 312, 314, 319, 320, 321, 405, 602	Diode, WG-713	IP 20–0145
CR107, thru 110, 112, 307, 308, 309, 313, 315 thru 318, 322, 323, 324, 501, 601, 603	Diode, 1N60	IP 20–0060
CR203	Diode, ITT 310	IP 20–0151
CR204, 303	Diode, 1S1007	IP 20–0020
CR301, 302	Diode, 1S2472	IP 20–0021
CR304, 305, 401 thru 404	Diode, 1N60P	IP 20–0016
CR502, 701	Diode, 1N4004	IP 20–0025
CR702, 703, 704	Diode, BZ090	IP 20–0019
IC501	Integrated Circuit, TA7205P	IP 20–0161
Q1	Transistor, 2SC1307	IP 20–0154
Q2	Transistor, 2SC306 (1)	IP 20–0155
Q3	Transistor, 2SC1449 (1)	IP 20–0156
Q4, 6, 8, 10, 11, 14, 17, 18, 19, 21, 23, 24	Transistor, 2SC710C	IP 20–0002
Q5, 7, 13	Transistor, 3SK45B	IP 20–0157
Q9, 20	Transistor, 2SK19GR	IP 20–0012
Q12	Transistor, 2SC710B	IP 20–0001
Q15, 16, 25	Transistor, 2SK30	IP 20–0078
	Transistor, 2SK40 (Alternate)	IP 20–0162
Q22, 27, 29, 30	Transistor, 2SC372Y	IP 20–0006
Q26	Transistor, 2SD187Y	IP 20–0160
Q28	Transistor, 2SA495Y	IP 20–0159

INDUCTORS, CHOKES, AND TRANSFORMERS

L101, 109, 111	Choke, RF, .65 μH	IP 21–0071
L102, 107	Choke, RF, .22 μH	IP 21–0098
L103, 104, 302, 401	Choke, RF, 150 μH	IP 21–0074
L105	Coil, RF, C997N	IP 21–0206
L106	Coil, RF, C043N	IP 21–0095

L108	Coil, RF, C996N	IP 21–0205
L110	Coil, RF, C979N	IP 21–0181
L112	Choke, RF, 1.2 μH	IP 21–0179
L201	Choke, RF, 5.5 μH	IP 21–0101
L202	Choke, RF, 8.2 μH	IP 21–0180
L203, 204, 301	Choke, RF, 470 μH	IP 21–0195
L402	Choke, RF, 22 μH	IP 21–0072
T101	Transformer, RF, C042D	IP 21–0093
T102	Transformer, RF, C182Z	IP 21–0084
T103	Transformer, RF, C181Z	IP 21–0083
T201	Transformer, RF, Z287A	IP 21–0207
T202	Transformer, RF, Z286K	IP 21–0208
T203	Transformer, RF, Z285I	IP 21–0209
T204	Transformer, RF, Z284A	IP 21–0210
T205	Transformer, RF, Z188A	IP 21–0087
T206	Transformer, RF, Z282I	IP 21–0211
T301	Transformer, RF, C200Z	IP 21–0091
T302	Transformer, RF, C993N	IP 21–0212
T303 thru 306	Transformer, IF, S-183A	IP 21–0085
T307	Transformer, IF, S-190A	IP 21–0089
T401	Transformer, IF, S-111D	IP 21–0092
T402, 403	Transformer, RF, Z176I	IP 21–0078
T501, 502	Transformer, AF, L-57	IP 21–0186
T701	Choke, AF, K-18	IP 21–0112

MISCELLANEOUS

DS701 thru 707	Lamps, Indicator	IP 28–0009
FL301	Filter, FX07800 Crystal	IP 31–0047
J101	Jack, Antenna	IP 26–0013
J501, 502	Jack, Earphone	IP 26–0005
J601	Jack, Microphone	IP 26–0014
K1–4, L701	Relay, 12 V DC	IP 32–0005
S1	Switch, CHANNEL SELECTOR	IP 25–0037
S2	Switch, MODE	IP 25–0038
S3	Switch, PA/CB	IP 25–0034
S4	Switch, NB ON-OFF	IP 25–0036
YH1	Holder (12-Crystal)	IP 34–0004
Y201	Crystal, 11.740 MHz	IP 31–0058
Y202	Crystal, 11.790 MHz	IP 31–0059
Y203	Crystal, 11.840 MHz	IP 31–0060
Y204	Crystal, 11.890 MHz	IP 31–0061
Y205	Crystal, 11.940 MHz	IP 31–0062
Y206	Crystal, 11.990 MHz	IP 31–0063
Y207	Crystal, 7.4225 MHz	IP 31–0064
Y208	Crystal, 7.4325 MHz	IP 31–0065
Y209	Crystal, 7.4425 MHz	IP 31–0066
Y210	Crystal, 7.4625 MHz	IP 31–0067
Y401	Crystal, 7.8025 MHz	IP 31–0068

	Lens, Red TX	IP 30–0123
	Lens, Green RX	IP 30–0124
	Lens, Blue AM	IP 30–0125
	Lens, Amber USB	IP 30–0126
	Lens, White LSB	IP 30–0127
	Microphone w/Cord and Plug	IP 29–0016
	Speaker, 2 W 8 Ohm	IP 29–0017

SIDETALK 1000B ONLY

C707	Electrolytic, 100 µF/16 V	IP 22–0008
C708	Electrolytic, 3300 µF/35 V	IP 22–0039
R133	Potentiometer, Trimmer 500 Ω	IP 24–0012
R134, 519	Potentiometer, (CALIBRATE, SQUELCH) 10 k Ω-B	IP 24–0043
R229	Potentiometer (CLARIFIER) 10 k Ω-B (w/detent)	IP 24–0042
T702	Transformer, Power, M-61	IP 21–0214
CR705 thru 708	Diode, UB5B	IP 20–0164
CR709, 710	Diode, BZ071	IP 20–0027
Q31	Transistor, 2SD180	IP 20–0028
Q32	Transistor, 2SC509	IP 20–0165
DS708	Part of M2	
M1	Meter, S/RF/SWR	IP 27–0009
M2	Assembly, Clock, GG1672C	IP 30–0134
S5	Switch, Meter	IP 25–0039
S703, 704	Part of M2	
	Bezel	IP 30–0139
	Bracket, Mobile Mount	IP 30–0118
	Case	IP 30–0137
	Dial, Channel	IP 30–0136
	Knob/MODE, CLARIFIER, RF GAIN, VOLUME, SQUELCH)	IP 30–0135

SIDETALK 1000M ONLY

R229	Potentiometer (CLARIFIER) 10 k Ω-B	IP 24–0001
R363	Potentiometer, Trimmer, 10 k Ω	IP 24–0005
R519, 521	Potentiometer, Concentric (VOLUME/ SQUELCH w/Switch)	IP 24–0017
M1	Meter, S/RF	IP 27–0007
	Bezel	IP 30–0119
	Bracket, Mobile Mounting	IP 30–0117
	Cover, Lower	IP 30–0121
	Cover, Upper	IP 30–0120
	Dial, Channel	IP 30–0122
	Knob (MODE, CLARIFIER, RF GAIN)	IP 30–0094
	Knob, Inner (VOLUME)	IP 30–0092
	Knob, Outer (SQUELCH)	IP 30–0093
	Panel, Front	IP 30–0128

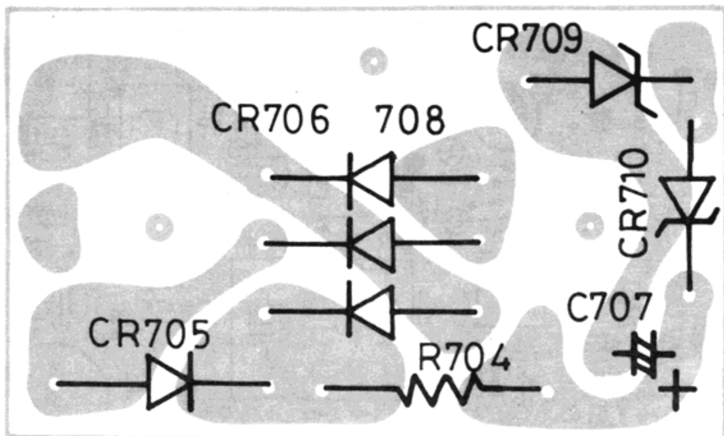


Figure 5-1 Rectifier & Regulator Parts Locator
(Component Side) ST–1000B Only

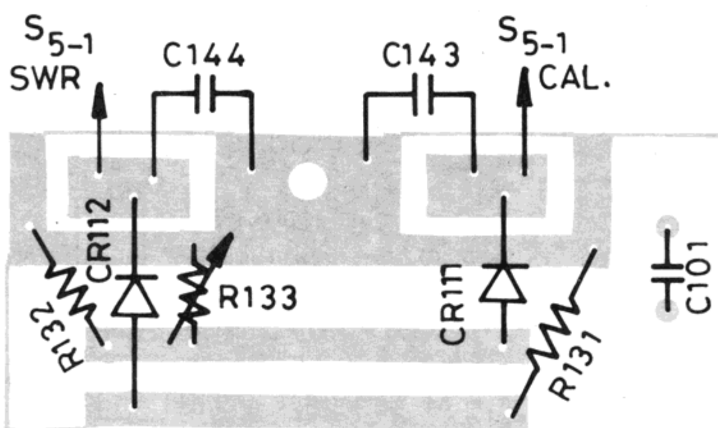


Figure 5-2 SWR Meter Circuitry Parts Locator
(Component Side) ST–1000B Only

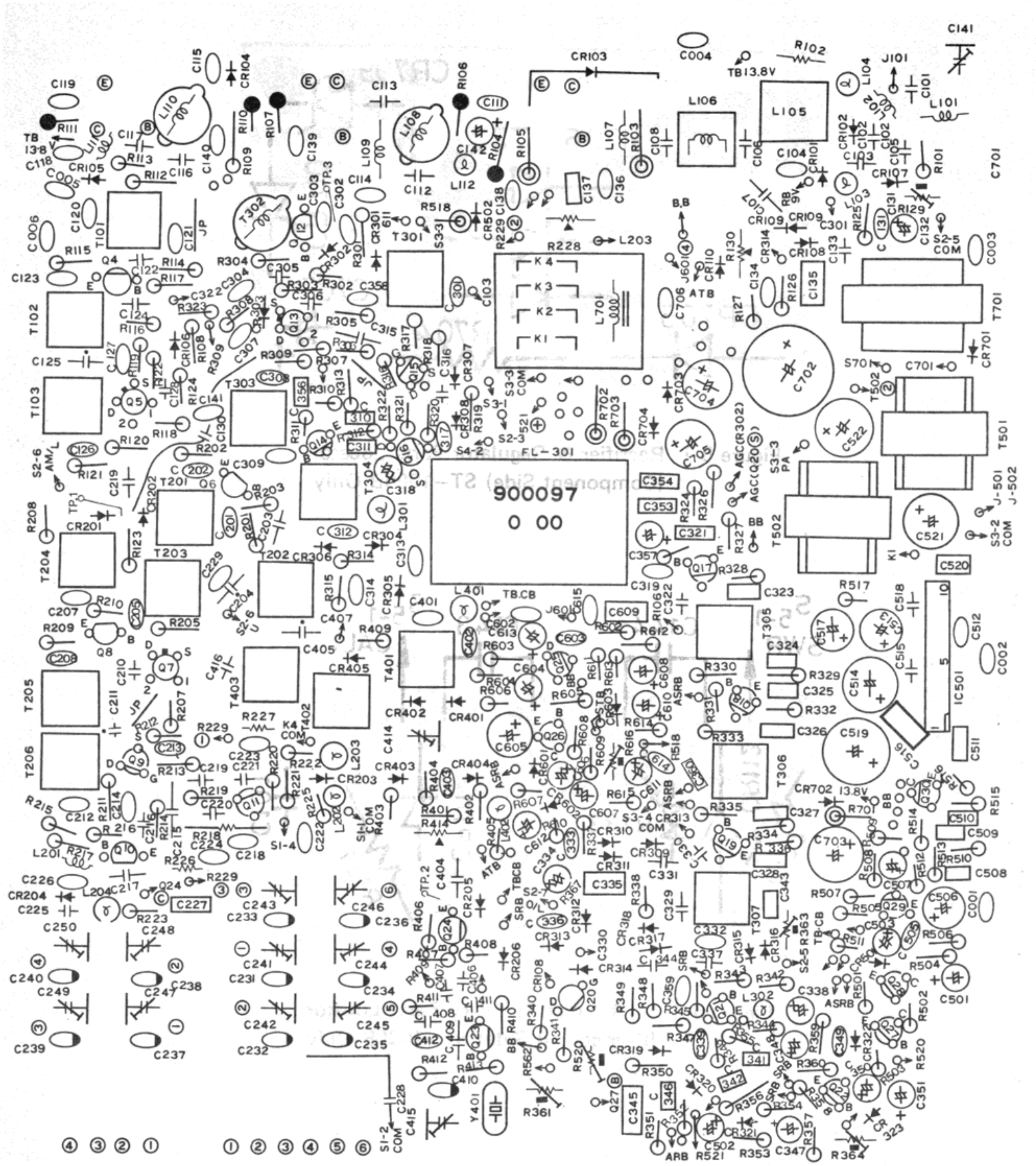
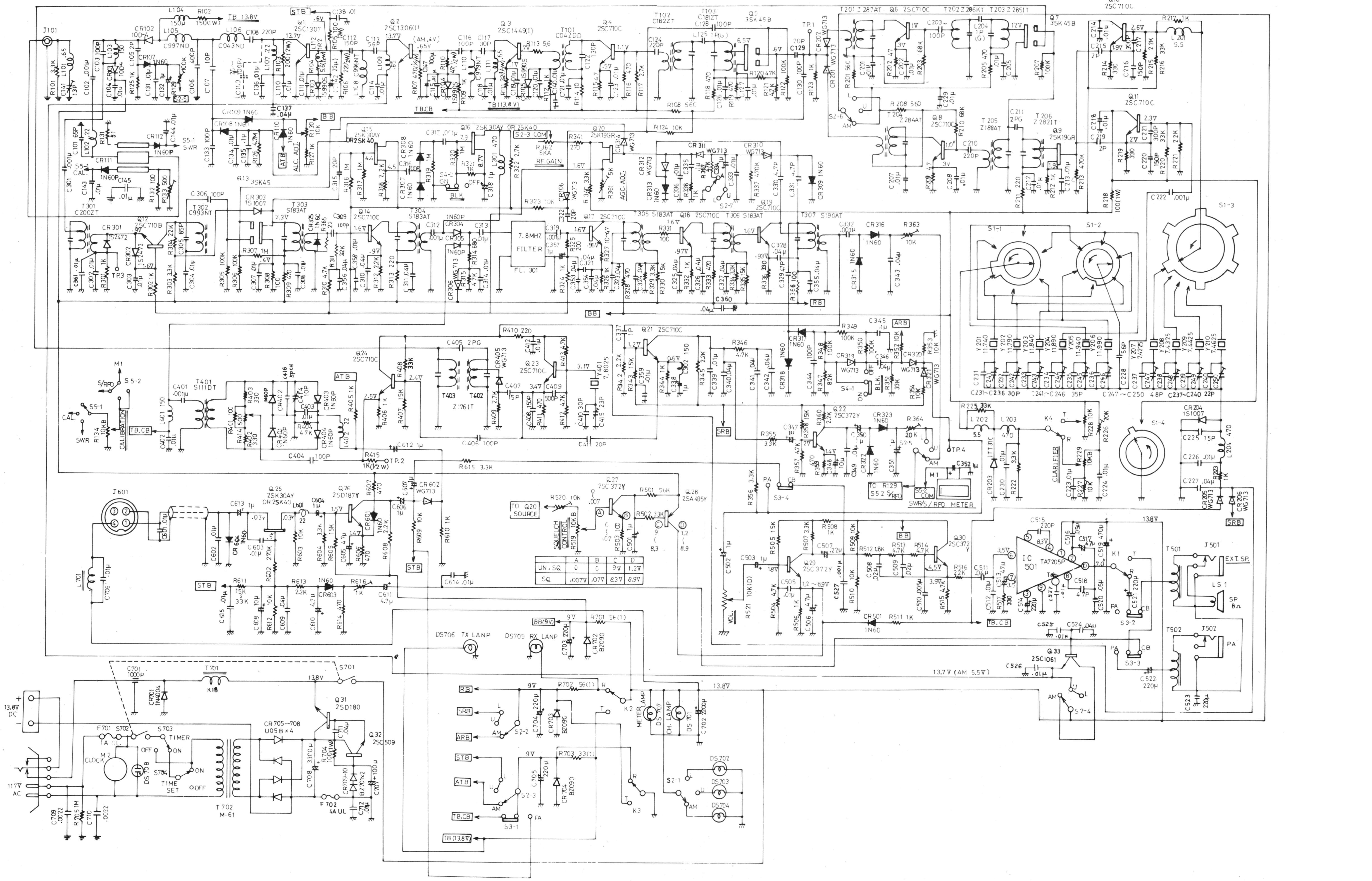


Figure 5-3 Main Board Parts Locator Both Models (Component Side)

ST 1000 B SCHEMATIC DIAGRAM



ST 1000 M SCHEMATIC DIAGRAM